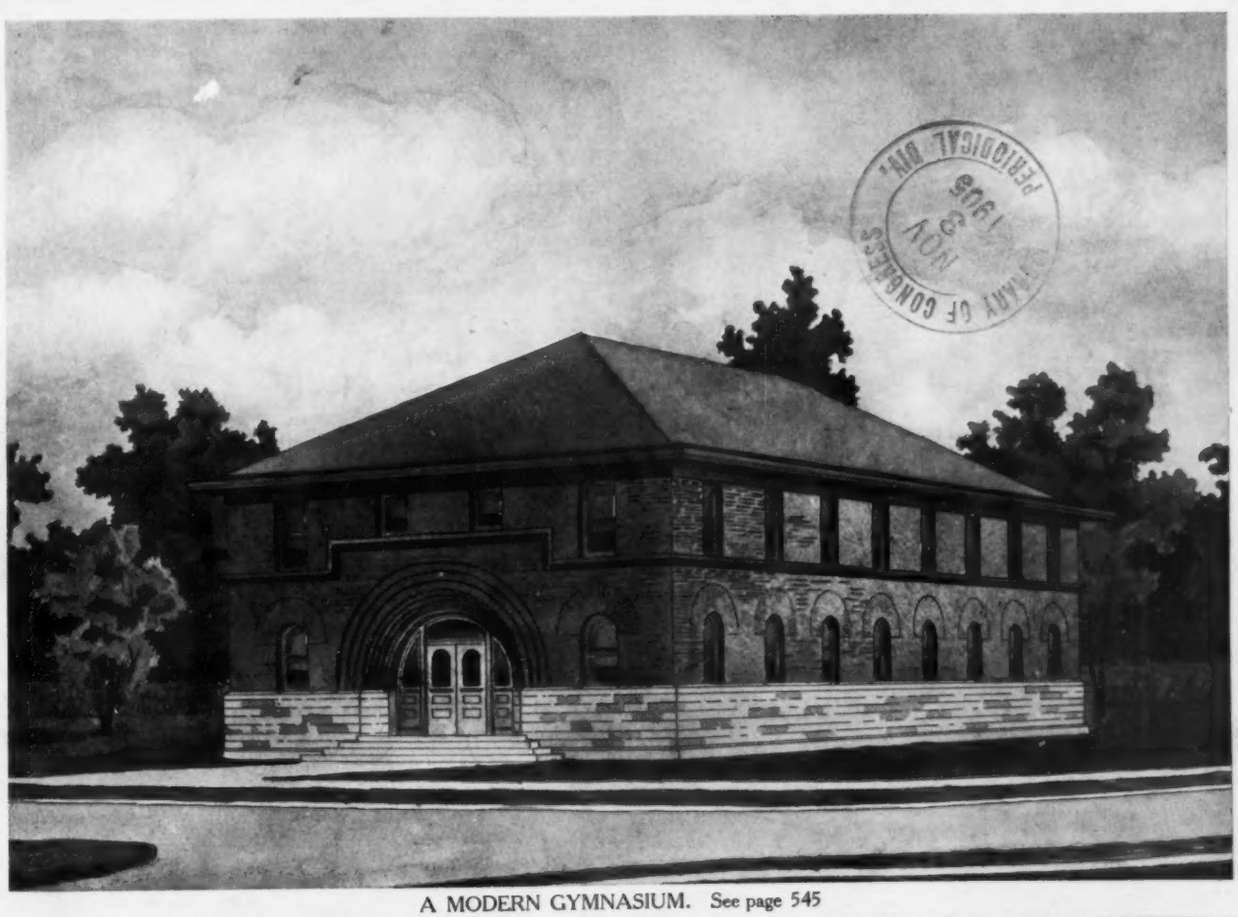
AMERICAN CARPENTER AND BUILDER



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A MODERN GYMNASIUM. See page 545

NOVEMBER, 1905 Price 20 cents

Over Nine Tons of American Carpenter and Builders

REPRODUCTIONS OF UNITED STATES POSTOFFICE RECEIPTS, COVERING THE MAGAZINES MAILED IN FOUR DAYS IN OCTOBER—TOTAL NUMBER OF POUNDS, 18,062

Advertisers

Advertisements to insure insertion must reach this office not later than the 20th of the mo th preceding publication. Circulation considered we have the cheapest trade journal in the world for advertisers. Rates furnished on application.

AMERICAN CARPENTER AND BUILDER

Subscribers

In order to avoid missing any issues of our magazine, subscriptions should be renewed promptly, as no copies will be sent after expiration. In requesting change of address, kindly give us your former address.

Talks With the Editor

SINCE we have been so successful in the past in pleasing our subscribers and advertisers we feel it no more than right that we should take our "great family" of readers into our confidence and discuss some of our plans for the future.

While we have endeavored to give our readers the very best things to be had, we still feel that there are undoubtedly many lines along which our readers could give us some valuable suggestions. We do not know all there is to be known in the carpentry and the building trades, and we hope we never may, for it is the new things which are arising every day that make work pleasant and interesting. We therefore ask your help along this line. One of you may be an exceptionally good roof framer, while another has made stair building his specialty. We want you to use our magazine as a place to exchange your ideas and give everyone the benefit of your study and experience. There is nothing more helpful in getting out a good and useful magazine than suggestions from the readers, for we wish to give you not what we want, but what you want.

Another thing we wish to talk to you about is the discussion of great topics which will be of general interest. We shall be pleased to receive suggestions for new subjects to be discussed. We have endeavored to cover the various subjects which the carpenter and builder will come across in his ordinary work, but we may have omitted some which might occur to our readers, and if so we should be pleased to hear from them and we will see that they are ably discussed.

If you are pleased with our magazine write us and tell us so, for we are as human as you are and feel encouraged if our work is appreciated. If our magazine is not satisfactory we also desire you to write us and let us know, and we suggest that you tell us where our failing is so that we can remedy it.

Our Christmas Issue

We are planning some very special features for our Christmas number, which will be issued promptly on the first of December. We are having a special title page prepared, which will be particularly appropriate for the season, while the magazine will be enlarged and contain many new, interesting and timely articles. Our editors are all hard at work getting ready their contributions on the various trade subjects for this number, and each will endeavor to outdo the other in making their articles unusually timely and interesting. Uncle Rural is expected to take Christmas dinner out, but he will still insist on "talking shop," and has some very helpful and instructive thoughts all ready to give to our readers in this special holiday number.

To Our Advertisers

That we have succeeded in reaching the people who are in need of your articles is shown by the kindly letters many of you have favored us with, and we wish to thank you for the same, as they have been most encouraging to us in our work. We trust that in the future if your returns are satisfactory you will from time to time let us know, and if for some reason you are not satisfied be sure to write us so we can find out where the trouble lies and what we can do to remedy it.

We are pleased to be able to state at this time that our subscription list has passed the twenty-five thousand mark, and it is continually growing, which means that more people who are in need of what you have to sell are constantly brought in touch with your display in our paper.

Will Make it Fifty Thousand

Seven months ago, when the first number of the AMERICAN CARPENTER AND BUILDER was issued, we set as our mark for the first year 25,000 subscribers. Now that we have reached that goal, it is necessary to move the mark. We are now determined to have 50,000 subscribers. We do not know the meaning of the word "fail," so that our "large family" is sure to be a large family in every sense. We have a list of the names of 315,000 carpenters and builders. Twenty-five thousand of these have subscribed for the AMERICAN CARPENTER AND BUILDER. We will now proceed to get 9 per cent of the remaining 290,000.

We also planned to secure 25 pages of advertising the first year. We had 30 pages in the October issue and in this issue (our eighth) we have 36 pages. That is growing some, isn't it? We will have 60 pages before we start our second volume. Watch us grow.

TOTAL NUMBER OF POUNDS, 18,062

"Victor" Scroll Saw.

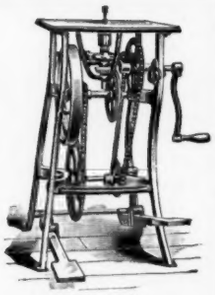
"Diamond" Mortiser.

FOOT, HAND AND POWER

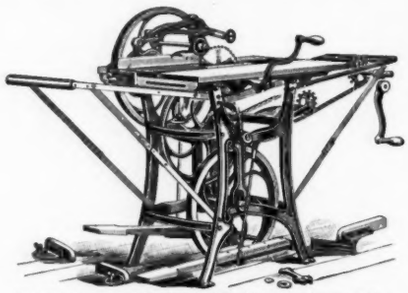
WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers, and Other Wood-Workers

BUILT FOR HARD WORK, ACCURATE WORK AND LONG SERVICE


"Rex" Moulder.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.

No. 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

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The Seneca Falls Manufacturing Co.

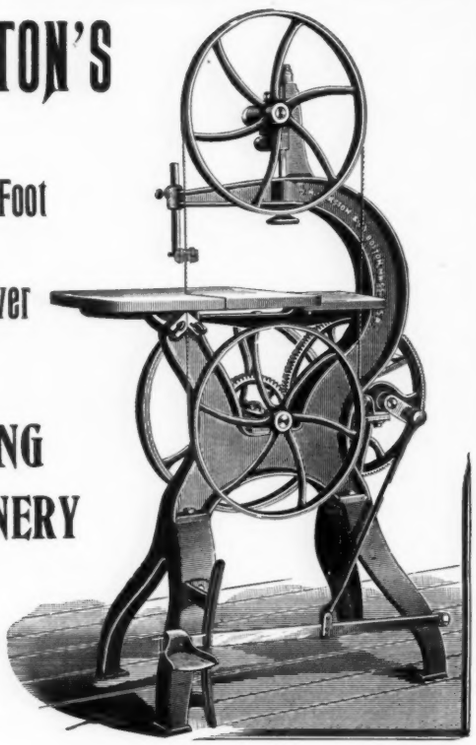
218 Water Street, Seneca Falls, N. Y., U. S. A.

No. 6 "Union" Combination Saw. (96)

MARSTON'S

Patent
Hand and Foot
and
Steam Power

WOOD WORKING MACHINERY


20-inch Hand and Foot Power Band Saw.

J. M. MARSTON & CO.

227 Ruggles St., Boston, Mass., U. S. A.

COMPLETE OUTFIT PRICE $15.00
HAND AND FOOT-POWER
MACHINERY

Our No. 7 Scroll Saw is warranted to be made of good material and workmanship, and to saw pine 3 inches thick at the rate of one foot a minute.

Send for Catalogue.

W.F. & Jno. Barnes Co.

74 Ruby St. ROCKFORD, ILL.

Crescent Jointers Always Give Satisfaction

You may be in a hurry for a job and crowd a CRESCENT JOINTER to the limit of capacity, and get just as good work as though you had not crowded the machine at all.

Every fellow fortunate enough to own a CRESCENT JOINTER is so perfectly satisfied that when any of his friends want a jointer he tells them on the spot to order a CRESCENT.

You will do the same when you get one.

Catalog describing our elegant line of BAND SAWS, SAW TABLES and JOINTERS mailed on request.

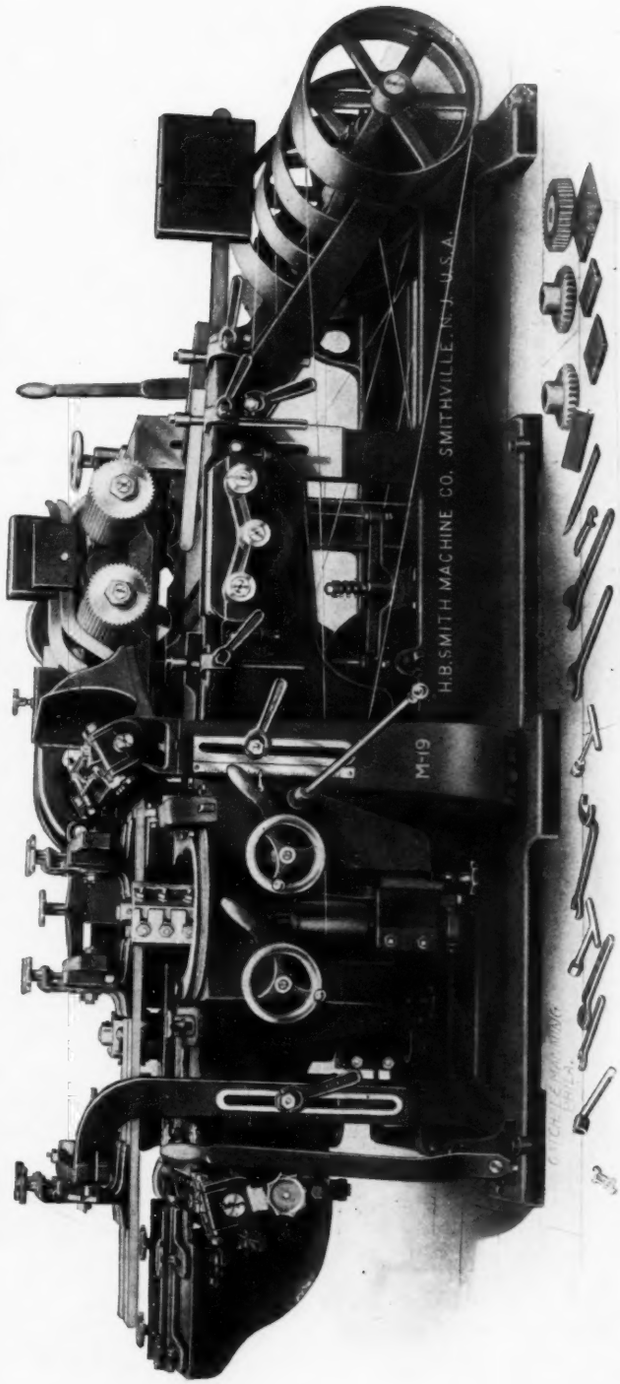
SEND FOR IT NOW

THE CRESCENT MACHINE CO.

224 Main Street, - - - LEETONIA, OHIO

Always Get the Best

Awarded the Gold Medal at the World's Fair, St. Louis
for Superiority of
Wood Working Machinery



Cut of No. 105A, Extra Heavy 12-inch Moulding Machine

Extra heavy moulders to work 8, 9, 10 and 12 inches wide, with levers both front and rear to operate Clutch Feed. Inside spindle attached to table, adjusts and locks from front. Also many other sizes of Moulders

And More than 150 Different Machines for Working Wood

H. B. Smith Machine Co.

SMITHVILLE, N. J., U. S. A.

BRANCHES: NEW YORK, BOSTON, CHICAGO

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The Best is Cheapest

"Yankee Tools"

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up-to-date mechanic could buy tools of their quality and character.

Other tools are very good tools, but "Yankee" tools are better.

"Yankee" tools are sold by all leading dealers in tools and hardware everywhere. Ask your dealer to see them.

Our "Yankee" Tool Book tells all about these and some others, and is mailed free on application to—

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No. 30. "Yankee" Spiral-Ratchet Screw Driver, Right and Left Hand.

No. 44. "Yankee" Automatic Drill, Eight Drill Points in Handle, and Adjustable Tension to Spring.

No. 50. "Yankee" Reciprocating Drill for Iron, Steel, Brass, Wood, etc.

North Bros. Mfg. Co.
PHILADELPHIA, PA.

"FORSTNER" BRACE AND MACHINE BITS

FOR FINE CARPENTER, CABINET AND PATTERN WORK

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits, is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for coe-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

Manufactured by

THE PROGRESSIVE MFG. CO., Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. **Supplied in sets.** **Write for Catalogue.**

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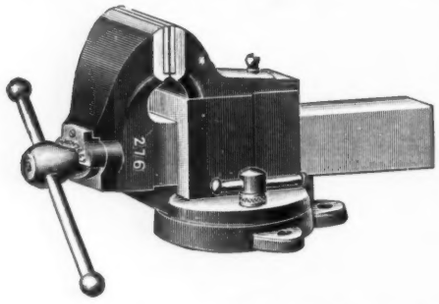

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FOR SALE BY DEALERS.

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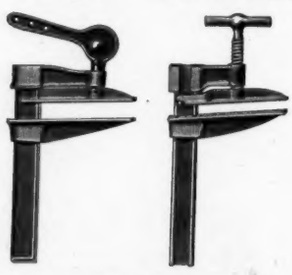
COLT'S CLAMPS.

Steel Bars Any Length Desired.

Quick Acting. **Time Saving.**

Eccentric and Screw.



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57 CENTER ST., Batavia, N. Y.

...WITH THIS...

Corner Brace

...YOU CAN...

Bore a Hole Anywhere

By simply adjusting the supporting handle to one of its eight positions and turning the sweep.

ASK YOUR DEALER ABOUT IT

Our Catalogue May Be Had for the Asking

H. H. MAYHEW COMPANY

SHELBURNE FALLS, MASSACHUSETTS

FAR AHEAD for smooth, easy work and holding edge will be YOUR VERDICT ON TRYING

CHAPLIN'S IMPROVED PLANES

Patented Feb. 14, 1899; Oct. 30 1900; Dec. 24, 1902.

We invite the Severest Comparative Tests

We want you to have a copy of our booklet

"A 'Plane' Talk About a Good Plane!"

We want you to have a copy, for it is a booklet you really need in your business.
We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

Tower & Lyon Company, 95 Chambers Street, New York

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MONEY REFUNDED

BEST PLANE IN THE WORLD.

ONLY SELF-SETTING PLANE MADE.

HAS AN ADJUSTABLE IRON THROAT

Sets Instantly with Minute Accuracy.

Every bit warranted to stand hemlock knot to user's satisfaction.

Works easy. See it at your dealers.

if plane is returned at

Our Expense

See our offer in September A. C. & B.

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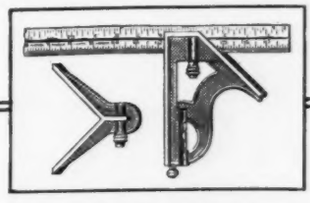

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COMBINATION SQUARE

THE ORIGINAL : : THE MUCH IMITATED

Send for free Catalogue No.176, of Fine Tools for all kinds of mechanics.

The L. S. STARRETT CO., Athol, Mass., U. S. A.

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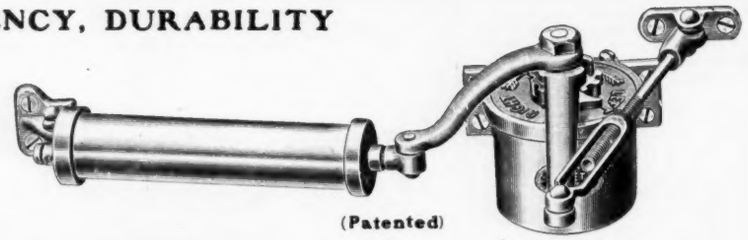
SIMPLICITY, EFFICIENCY, DURABILITY

Made to stand the test under all conditions.
Will last a lifetime.
The air cylinder is closed to keep out dust and grit.
The spring is of round coiled wire encased.
Adjustable tension.
Can be reversed from right to left hand doors without changing spring.
Easily applied. Neat in appearance. Always ready.
No repair bills. Send for circular.



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IRON WORK FOR BUILDINGS.

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BEAMS. LIGHTS.
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HOLMES PYOTT & CO.
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For Concrete Blocks, Wood or Iron Beams.

Many Sizes in Stock.

Special Shapes to Order.

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STRAPS, BOLTS, PIN ANCHORS.

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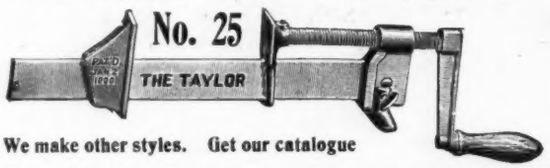
They Last a Lifetime

The grip is positive and instantaneous. No other clamp is half so quick, or so strong.

This One Takes 10,000 lbs. Clamping Strain



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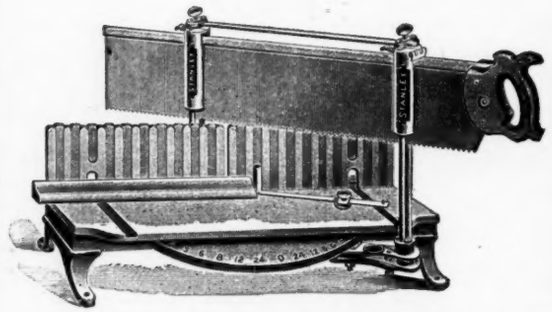

On the edge of the Solid Metal Base, (where they will always remain correct) degrees are accurately graduated.

As the Swivel will automatically lock at any point, the operator can quickly set the Saw to cut the angle needed.

For duplicating work, a stock guide can be screwed in a threaded Plate, inserted in base board, making a perfect length gauge.

With these new features, the **Stanley Mitre Box** is more than ever a necessity to all wood-workers.

For full description, sizes, and prices, write for Catalogue No. 34.

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WE have pulled the prices down until you can save money by placing your order with us. Every piece of goods guaranteed to be as represented and illustrated.

ONLY STANDARD MADE GOODS HANDLED.

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We do Business on the Level

SPIRIT LEVELS
Carpenters' Levels
Machinists' Levels
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36 Years on the Market
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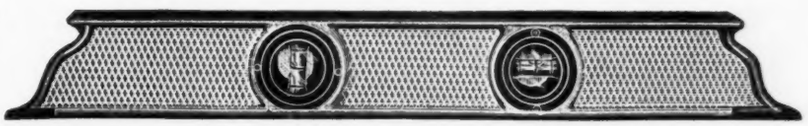
IF YOU DO NOT USE A COOK'S PATENT LEVEL

"NO OTHER"
"JUST AS
GOOD."



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IRON
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YOU LOSE THE SATISFACTION OF HAVING **THE BEST** LEVEL ON EARTH. WE LOSE THE PROFIT.

FOR CARPENTERS, MACHINISTS, MASONS EVERY LEVEL WARRANTED

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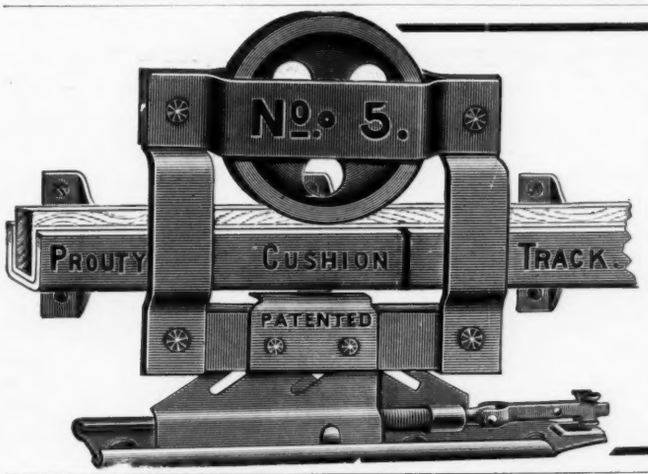
DAVIS & COOK

13 HIGH STREET
WATERTOWN, N. Y.



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Noiselessness, Strength and Easy Running

These qualities are all embodied in the

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Felt compression washers on shaft each side of wheel and the felt lining in rail absorb all sound vibrations. Our adjustment is positive, as it locks after door is in place and door plate is removable without disturbing the adjustment.

Be sure that you get the **Prouty No. 5 Cushion Track Hanger,** as there are numerous substitutions on the market.

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THE UP-TO-DATE
STAR EXPANSION BOLT

With the STAR you can fasten things to brick and stone about as easily as to wood and much more firmly.

Write to us for samples and information.

STAR EXPANSION BOLT COMPANY
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SHELF SUPPORTED ON PINS.
JOHNSTONS
PATENT
SHELF PIN.
1 DOZ 15¢ 1 GROSS 85¢
THESE PINS ARE USED FOR SUPPORTING MOVEABLE SHELVS IN BOOK CASES.
FRONT FULL SIZE
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CANNOT FALL OUT OR SAG DOWN. THE BEST SHELF PIN MADE. EASILY PUT IN PLACE BY ANY ONE.
SEND FOR FREE SAMPLE TO J.D. Johnston
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This Shelf Pin is neat in appearance, strong, easily put in place, easily removed, without the use of any tool, not liable to sag down or drop out of place. I have a neat model with pin attached which I will send to Architects.

It will support all kinds of movable sheves in all kinds of cases, or cupboards, or cabinets.

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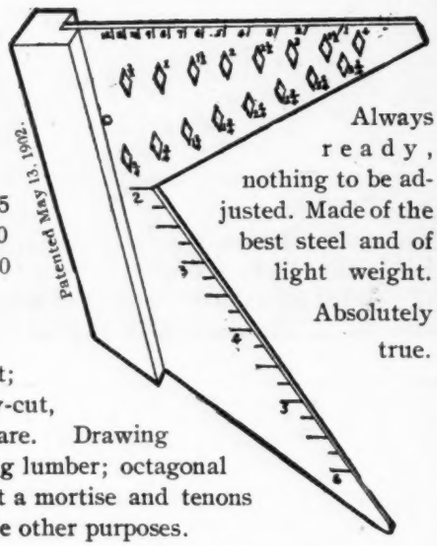

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For sale at all first class tool dealers.

The Duby & Shinn Mfg. Company, (Inc.)

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Key to the Steel Square

By ALFRED W. WOODS

IT is a wonderful instructor. It instantly gives the figures to use on the common steel square for the lengths, cuts and bevels for all rafters. It also gives the figures to use for all polygonal miters, hopper cuts, etc. Size, three inches in diameter, complete with book of instruction, all in morocco case suitable for the pocket. Can be consulted at a moment's notice.

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Send express or money order to

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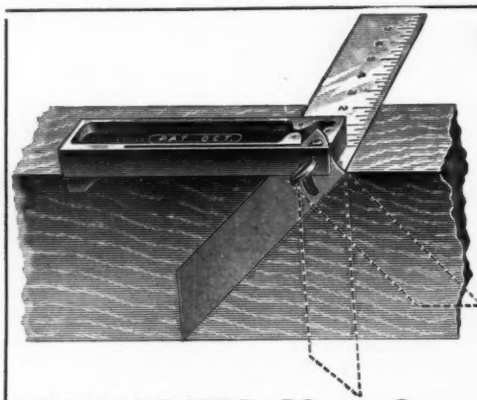

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Ideal Bevel Try Square

With one stroke of pencil you get both square and bevel cut without changing tools.

Send for particulars

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Our New Steel Square

Aside from excellence of material and workmanship, the greatest difference between the best **Carpenters' Steel Square** and the old iron square of the blacksmith, consists of the scales and markings on the improved tool. Our square, as recently improved, enables the carpenter to lay out all kinds of work and to calculate quantities with an ease and accuracy never before known.

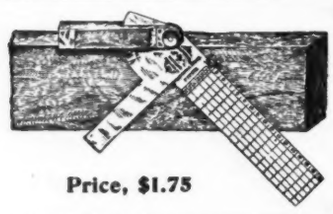
Our Steel Square Book, describing the new tool, is a veritable

PRACTICAL TREATISE ON THE STEEL SQUARE

and we will send a copy, without charge, to anyone who in writing us will mention the American Carpenter and Builder

SARGENT & COMPANY

1149 Leonard Street NEW YORK



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A PERFECT TOOL and the only Tool for the purpose ever invented.

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IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for circular. Address the manufacturers,

G. A. TOPP & CO., Indianapolis, Ind.

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For a First-Class Strip for Door Bottoms. We have the article in our

O-K METAL WEATHER STRIP

Its efficiency, durability, and handsome appearance are unequalled. Keeps out every bit of draft, dust and water. Every carpenter and contractor should have a supply on hand now. Cannot fail to satisfy. Fine profits. It is made in two non-rustible finishes.

Write for full particulars, prices and terms.

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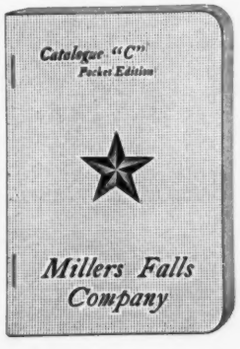

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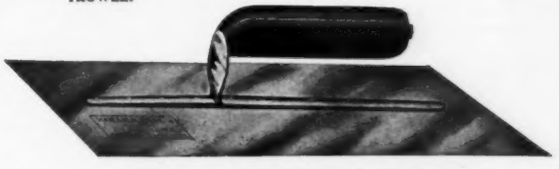

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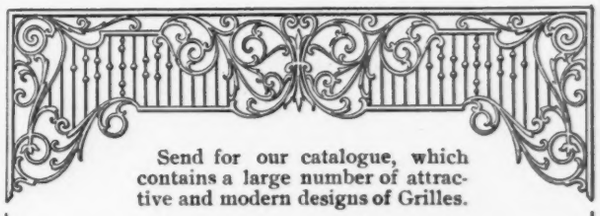

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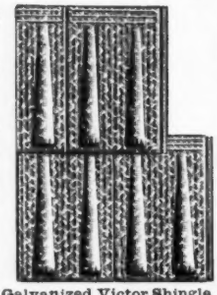

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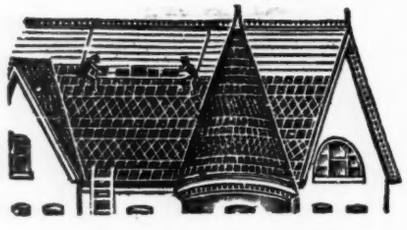

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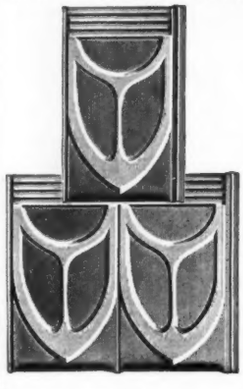

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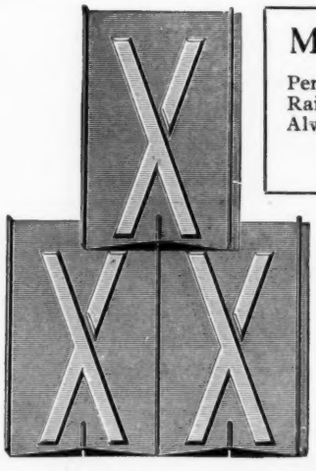

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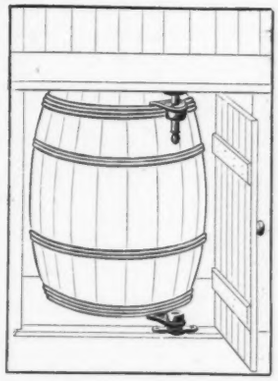

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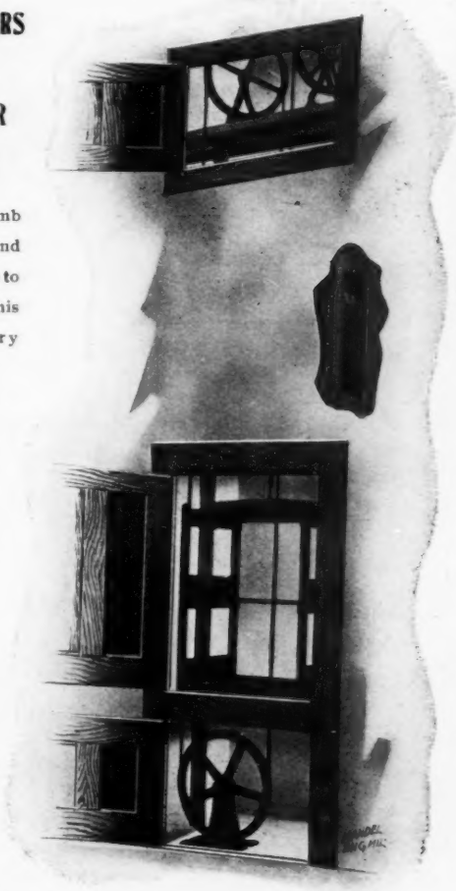

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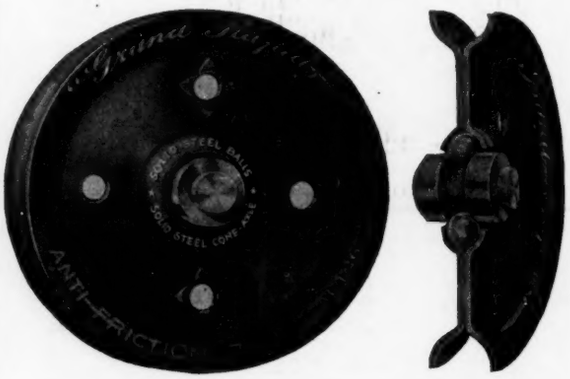

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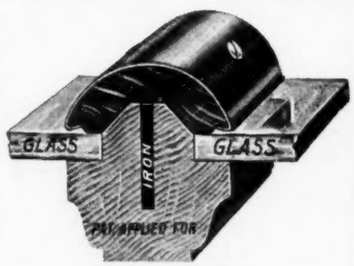

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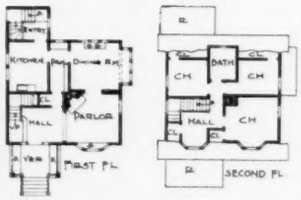

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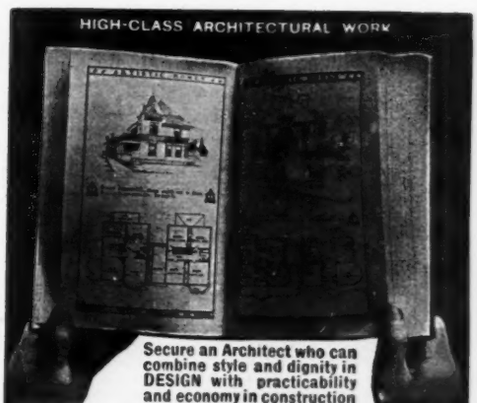

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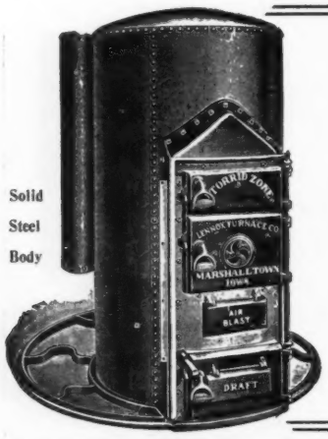

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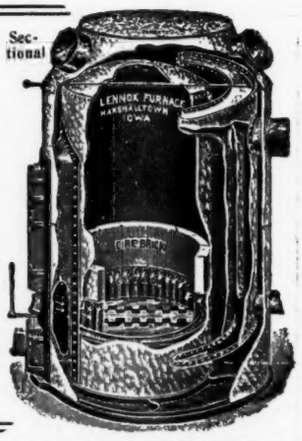

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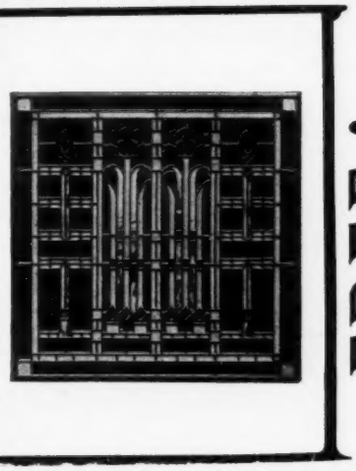

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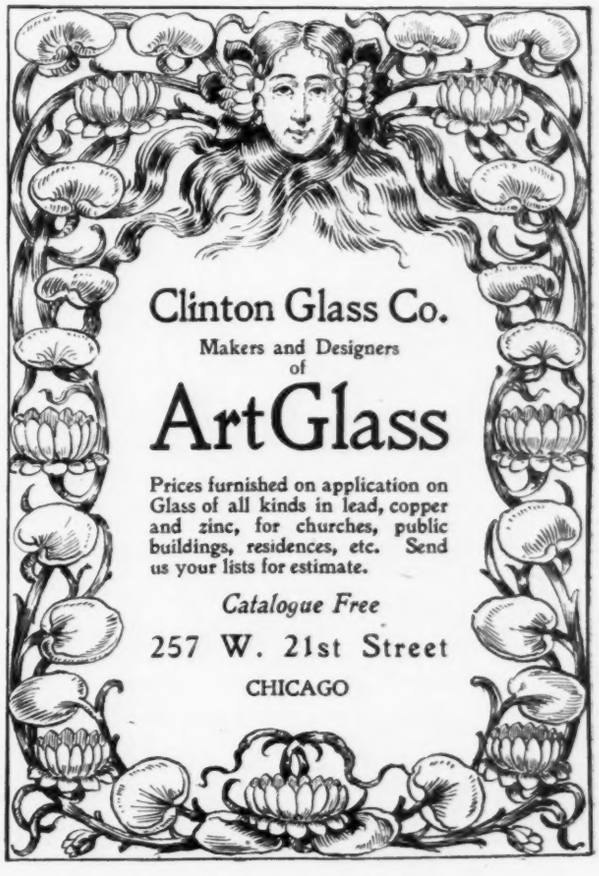
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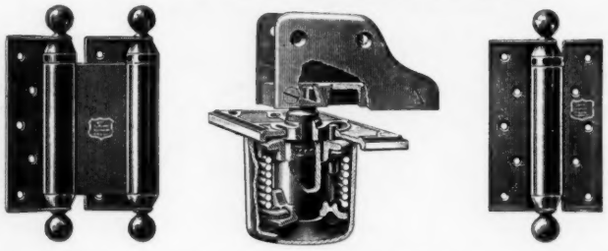

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Uncle Rural's Opinion on Nursing a Job

BY J. CROW TAYLOR

IT WAS Thanksgiving, and there was a small gathering at Uncle Rural's for supper. They call it dinner in the city, but it is still supper in the country, and the gathering was because of the habit that Uncle Rural had of always trying to be home at certain holidays and to have with him at his home certain of the boys and men that worked for him. Uncle Rural and Aunt Cynthia had no children of their own, but they always had some young people in the home. Aunt Cynthia had raised and married off a number of girls, some orphans, some distant relatives, and as fast as one married off she managed to get hold of another, while Uncle Rural nearly always had some young fellow working for him who made his home at the house. So they really played father and mother to more young people than some who raise large families. On this occasion there was at supper besides Uncle Rural and Aunt Cynthia, Susie Andrews, whom she was raising, Mosby, who had been somewhat down in the mouth since he had made an unfortunate mess of the building of a certain barn, J. B. and Lefty Rose. That was not his name, but he got the name Lefty by being the only left-handed man of the crew and he had been known by it so long that practically nearly everybody had forgotten that he had any other name but Lefty. There was turkey, of course, and all the other good things that go to make up a regular old-fashioned country dinner, and all the surroundings were in harmony. There was no display of what you might call luxuries, but it was all very impressive in a quiet way just the same, because it was so truly homelike and in harmony with the simple but kindly life led by Uncle Rural and Aunt Cynthia.

Aunt Cynthia

Somehow the countenances of Mosby and J. B. did not become attuned to the surroundings on this occasion, and this fact did not escape the notice of Uncle Rural, but he did not say anything about it until the meal was practically over, then he turned to J. B. and said: "Young man, you don't seem to be as thankful or cheerful as you ought to be on an occasion of this kind, and I am thinking that maybe it will relieve your mind and put you in a better frame of mind to tell us of your troubles—unless it is of a strictly private nature."

"I guess I am feeling kind of sour, Uncle, and naturally Mosby is not feeling much better, because he and I are up to the question of starting into the winter working at half price or else losing a big job of work."

"How is that? Wouldn't they take you at full value on that cement company deal?"

"That's the way is looks right now, Uncle. As you know, the cement company is going to build about twenty houses for its employes, and, acting on your advice, I concluded to start out for myself and bid on the work, or at least Mosby and I together bid on it. The manager was very nice about it at first; said he had heard of me and was favorably impressed, not only with my training under you, but with a certain element of push that seemed to be a part of my make-up, and he said he would be glad to give me a show at the work, and as I had a reputation for speed he

had an idea that we would get along all right together, and then he gave me the plans of one of their small shacks or cottages to figure on, saying that as a matter of business he was in duty bound to get competitive figures on this work and get it done as cheaply as possible, consistent with the nature of the work. It looked like easy sailing, because the house he gave me to figure on was very simple, and it didn't take me very long to figure out just how long it would take Mosby and me to do the work. But when I turned in my figures he said he would like to give me some work but could not do it at that rate, and now it is up to me to either cut prices, and for Mosby and me to work at about half the wages we are supposed to earn, or else pass up the job and let some jackleg have it that is willing to work at $1.50 a day, and you know one of the things that you have always taught me is I should always put a fair value on my work if I expected people to value my services. I know that I can do work as fast as any ordinary man, and that there are no other two men that can build that house in less time than Mosby and I can, but I guess there are some people who are willing to take it for less, and where there are people always ready to do things of that kind it looks like there is no show for a good man."

Susie Andrews

"Tut, tut, young man; there is always a show for a good man, and frequently even at work that does not appear to require much skill."

"I knew you would say that, Uncle, because that is a pet theory of yours, but here is a condition we are up against, not a theory. Here is a little shack I figured on that will take Mosby and me ten days to build, and, as I said, we can build it in just as quick time as any two men in the country, and from what you have told me I estimate that our time when we shoulder responsibility like this ought to be worth $3.00 a day each, which would make $6.00 a day for ten days, or $60.00, and to this I only added $10.00 for risk and profits and made a price of $70.00 on the job. Now, what am I going to do about it? Cut the $10.00 profit off and simply hire the two of us to the manager for $3.00 a day and take the risk of getting through the work as I have figured it? I figured on that, too, and find that won't bring us in, because I think he has an estimate that is under this $60.00, and the matter simply comes down to our cutting our wages below what they ought to be worth."

"You mean you think it comes down to that," said Uncle Rural, as he commenced making some figures on Aunt Cynthia's white tablecloth. This was one weakness Uncle Rural had, this habit of figuring on the table cloth at the end of the meal, and sometimes Aunt Cynthia would make it a point to put some blank paper beside his plate to save him doing this, and then at other times she felt like remonstrating with him, but it seemed to give him so much pleasure and was one of the very few weaknesses he had, so, that, especially on an occasion like this, she even seemed to take pleasure in seeing him soil up a clean table cloth with a lot of pencil marks and figures. "It looks like a simple problem, J. B., and your arithmetic is all right when you say two men at $3.00 a day for ten days equals $60.00, and figures don't lie, but there are several ways of killing a cat, even if it does have nine lives, and there are compound as well as simple problems in arithmetic. First, though, I want to ask you if you remember when you and Lefty both came to work for me and what we did?"

"I know," put in Lefty, "it was just before Thanksgiving, the year of the panic, and if we had not gone to work for you we would have stood a mighty good chance to starve."

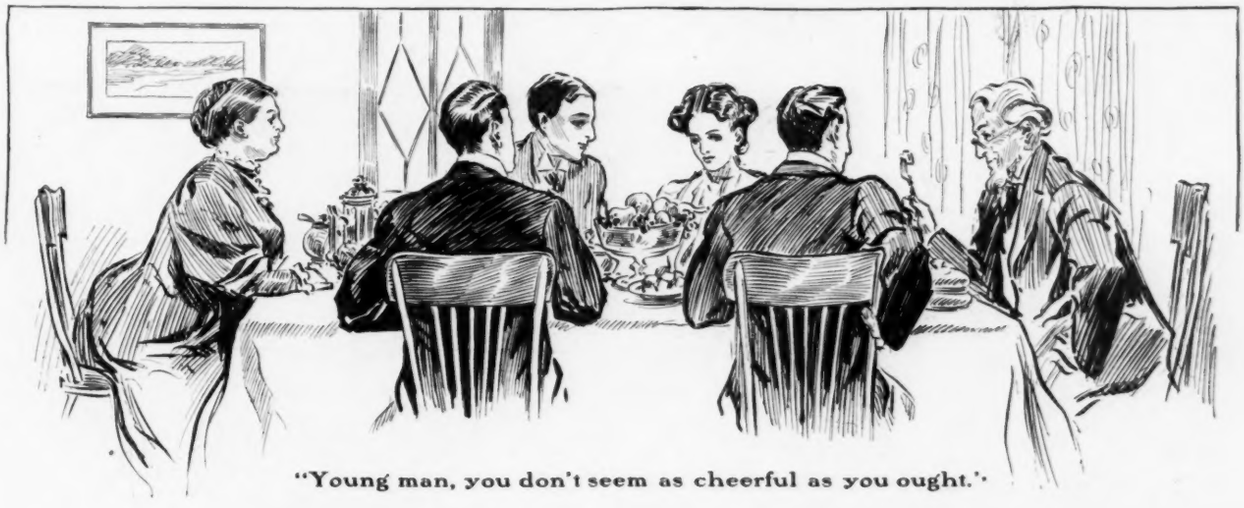
"Well, Lefty," said Uncle Rural, "can you take a left-handed squint at this problem that is worrying J. B. in the light of what you helped me do when you first came with me and see a way for him to get around his trouble without cutting his wages?"

"No, I can't. We helped you make boxes, and all I can make out of it is that you have been mighty good to both of us ever since, and that is good enough for me, and I am not running off and hunting for something else as long as you've got something for me to do."

"Well," said Uncle Rural, "it was a hard year and there wasn't much building to do, but I went to making some boxes in the winter to keep going, and I couldn't make much out of it at the prices offered by doing the work myself, but when I hired you two boys, paying you only the smallest kind of wages, you soon got so you could do as much nailing as I could, and as a re-

sult I did a very good business that winter and incidentally made the boxes at the prices offered and got full price for my work with you two helping me."

Then, turning again to J. B., he said: "You are right about not cutting wages. You should not do that, but you will find there are other things in the carpenter business that you must learn besides that of handling tools and making speed yourself. The tendency, especially in work of the kind you have been figuring on, is to reduce cost. But there are several ways of reducing cost without reducing wages, and it is some one of these ways we must follow, if we can find one that will fit the case. There is a commercial theory to the effect that we can reduce the cost of anything by enlarging the quantity, and frequently lowering the cost to start with will have the effect of stimulating demand and increasing quantity. This idea does not apply on all buildings, because in some building operations the question of cost, while it is a factor, is of minor importance to a number of other things, but the work you are figuring on is of



"Young man, you don't seem as cheerful as you ought."

a simple nature, and the item of cost bobs up as a very prominent factor, and it is surprising to me that you have not discovered some way to reduce the cost in this instance without taking it out of your own pocket. You are not supposed to give the man money out of your own pocket, so to speak, but give him the use of your brains as well as your muscle, and in return therefor add money to instead of taking it from your pocket. Now, let us go back to your arithmetic and see what we can do. Here is:

Ten days' work for 2 men at $3.00	$60.00
Add profit	10.00
Total	$70.00

Now, then, it won't change that much to say one man 20 days at $3.00 equals $60.00, but there is a way to change it. Do you remember what I paid you when you first came with me?"

"About 50 cents a day, I think."

"Well, don't you think you can hire some boys and men, boys at 50 cents and men at $1.00 to $1.50, to help with this work?"

"Oh, yes, we can hire plenty of help."

"All right, then; we will make some more figures. Suppose, for illustration, we strike a general average of $1.00 for help. You can hire a man to help you for $1.00, another to help Mosby for $1.00, and the four of you can do twice as much work as two of you can do, because lots of the work there is of a very simple character and can be done by a boy that is handy with a hatchet and saw. That would give us two men at $3.00 and two men at $1.00, who would do the same work in five days that would be a cost item of $8.00 per day for five days, which would equal $40.00. It begins to look different now, don't it? Let us follow this idea a little further, then, and say you each take four helpers, which would be eight men besides yourselves, ten men in all who ought to do the work in two days, the eight helpers costing $8.00 a day and each of you $3.00 a day would make a total of $14.00 a day, or $28.00 for the job, and that is, as you will note, quite a different figure from the original $60.00 cost, which you say is the condition you are up against now. Of course, by increasing your force in this manner and reducing the item of cost you also enlarge the element of chance and must figure on a wider margin of profit, but these figures will serve to to show that there is room to handle the work you have been figuring on at a better figure than you made and still make more money than you were calculating on, especially when we take into consideration the item of quantity there. You were only given one house to figure on, but you know there are about twenty of these houses to be built by the company, and if you will make your figures right and ask for them all you will get them and you can make your crew even larger than this and scatter them out on different jobs and have a very good thing of it."

Both J. B. and Mosby brightened up wonderfully at this explanation, and it looked like there was noth-

(Continued on page 542)

A diagram showing the Plumber cutting holes for his pipes

AMERICAN CARPENTER AND BUILDER

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The AMERICAN CARPENTER AND BUILDER is issued promptly on the first of each month. It aims to furnish the latest and the most practical and authoritative information on all matters relating to the carpentry and building trades.

Short practical letters and articles on subjects pertaining to the carpentry and building trades are requested.

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A CERTAIN amount of selfish ambition is essential to any man attaining any marked degree of prominence in this world, but ambition, like a frisky colt, must be broken and carefully trained, before you can get good service from it.

Profitable to All

THE increasing popularity of the AMERICAN CARPENTER AND BUILDER as an advertising medium is readily seen by the thirty odd pages which we are this month devoting to that purpose. This may seem a trifle strange when we consider that it is only our eighth month in the field, but when the number and class of our readers are considered it is not at all unnatural. At this writing we have over 25,000 subscribers who are regularly kept in touch with what is new in the building world. Not only that, we reach 25,000 men who are in constant need of some tool or material to be used in their line of work, and we are fulfilling the mission of bringing those who wish to buy and those who wish to sell together.

This is profitable to us, as it satisfies our advertisers and our readers; it is profitable to our advertisers, as it brings them in touch with those who are in need with what they have to sell; it is profitable to our readers, as they will be sure of getting the best value for their money that could be had anywhere. It is gratifying to note that we are successful in our mission, as not only are our readers satisfied with the interesting and increasing variety of articles presented from month to month but our advertisers are more than pleased, which is plainly shown by numerous ones increasing their space and many others desirous to be given publicity through our columns.

We are not limited to any one section of the country, as our articles appeal to the trade in every section, which naturally accounts for the variety of advertising on our pages, as the wants of different parts of the country naturally vary.

Advantages of a Gymnasium

THE question which arises in almost every town sooner or later is, whether a gymnasium is a desirable thing to have, and whether the money put into it is well invested.

A gymnasium is a place where the young people can gather and go through various exercises to more fully develop their bodies; it is a place where they can play games, which, owing to severe weather, they otherwise could not play. You naturally will ask, what is the advantage in this? We will answer this by referring to a striking example in history.

The Greeks at one time were the most noted athletes of any nation. They excelled in all the various athletic contests and were considered the most perfectly developed people of the age. At this same time they were also at their best intellectually and morally. It was during this time that they built the Acropolis, held the pass at Thermopolæ and produced such literature as the Odyssey. When they no longer thought of the development of their bodies, their other accomplishments and virtues also left them, until they became lost in obscurity. This shows that when the body is well developed physically the mind naturally and unconsciously develops with it and is capable of producing better and purer thoughts. Furthermore a good, healthy person enjoys the open air and is brought in closer touch with nature, which is a spiritual training in itself.

A gymnasium will do not only this, but it will engender patriotism into the people of a town, as nothing awakens local pride more than to have a successful athletic team, and a man who is proud of his town is also proud of his state and country.

This should be of interest to every carpenter and builder, for their opinion will carry much weight when the gymnasium question is brought up for discussion. For it is the carpenter and builder who is going to construct it and make it a building of which the town may be proud. It is their children who will derive the benefit of it and take some of the most active parts in the contests, for it is the practical young men who are continually taking the lead.

STEEL SQUARE

ALFRED W. WOODS

The Steel Square and Its Possibilities

SHOWING THE RELATION OF THE STEEL SQUARE AS AN AID IN OBTAINING THE ANGLES IN THE GEOMETRICAL CONSTRUCTION OF MANY SIDED FIGURES

TOO much cannot be said as to the possibilities that come in range of the common steel square in connection with the degrees contained in the eighth part of a circle as applied to the right-angle triangle and their tangents. For they cover the whole

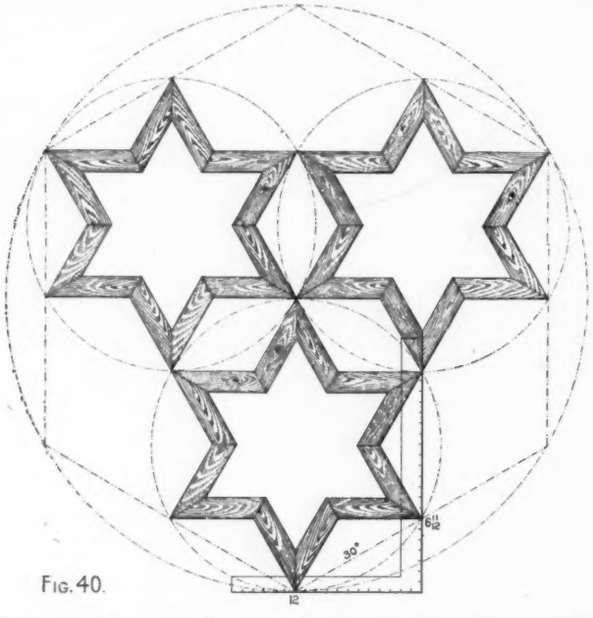


FIG. 40.

field of miters whether on a level or incline plane. The illustrations that we have been giving pertain to the miters resting at a level plane, but they form the basis for miters resting at an inclined plane, which pertain to the side cuts of rafters for any shaped building, the working out of geometrical hand railing, etc. All of which we will take up in due time, but for the present we have a few more illustrations we wish to present dealing with miters and angles which are general in scope and useful in solving geometrical problems.

In Fig. 40 is shown three hexagonal star-shaped frames inclosed in circles and these are contained in one large hexagon and the whole in one large circle.

The reader will notice that the figures given on the square are the same as those given in previous illustrations for the miter of the hexagon. The blade will give the angle for the inner points, while the tongue will give it for the outer points, or if 60 degrees is used, which falls at 20 19-24 on the blade, then the angles will be just the reverse on the square.

In Fig. 41 is shown six squares laid in pairs with their blades and tongues intersecting each other at the figures that give the hexagon miter, and produces one of the most beautiful examples in miter work. All of the angles about the squares form some part of the hexagon and it will be seen that the large circle that incloses the figure is equally divided into six parts.

In Fig. 42 is shown another form of drawing polygonal figures. In this we show two squares, though only one is needed. The second one is given for effect in balancing the drawing, as it will be seen that the same figures are used on both squares. The degree lines leave the 12 on the tongues at 15 degrees apart and intersect the figures on the blade as shown. Now since 15 is a multiple of the number of degrees that form several of the polygons, they are contained in this figure, as 15 is contained in 180 twelve times, 30 is contained six times, 45 is contained four times and 60 is contained three times. By referring to the illustra-

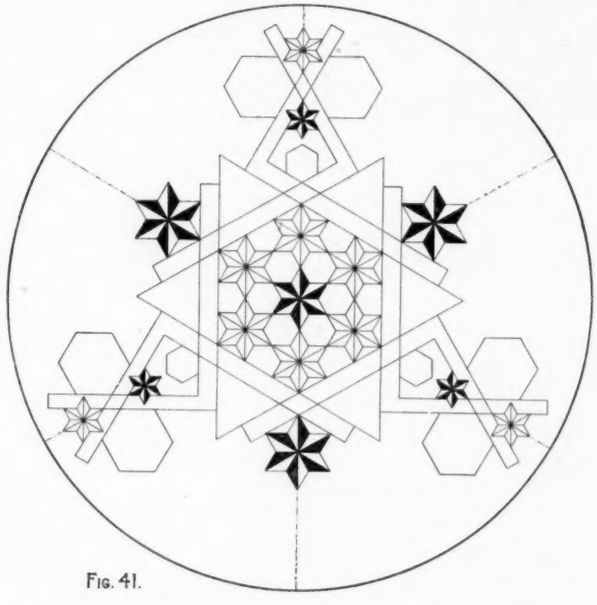


FIG. 41.

tion the reader will see that polygons of the above number of sides are all contained in this figure.

In Fig. 43 we have carried the above a little further, showing the same polygons as in the preceding figure, but in this case they have blossomed out into a flower.

In Fig. 44 is shown a diagram whereby the angles

and dimensions for any of the polygons may be accurately drawn by a system of lines passing through 12 on the tongue of the square.

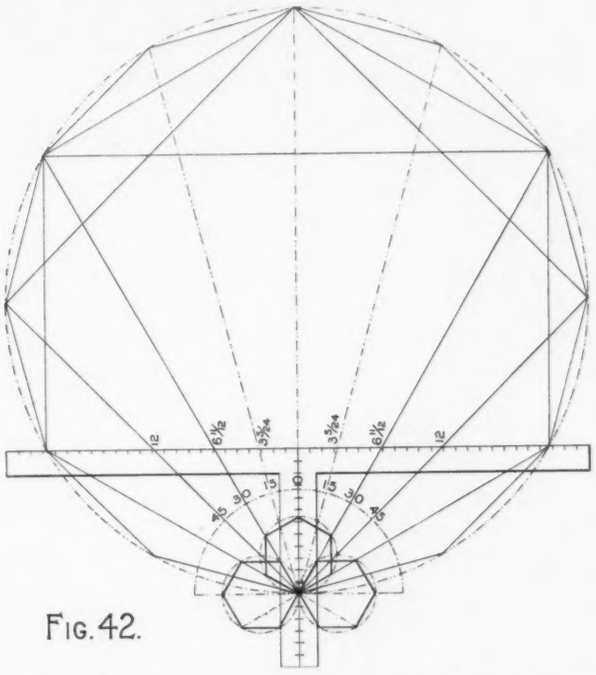


FIG. 42.

For illustration we have taken the heptagon or seven-sided figure.

The semi-circle 7-A is first drawn, which may be to any desired size. Place the steel square as shown with the 12-inch mark at the center. Then draw a line from 12, passing at 5 19-24 on the blade (which are the figures to use for the miter), and continue on, intersecting the semi-circle at 1. Then A-1 will represent one-seventh of the semi-circle and is equal to the spacing

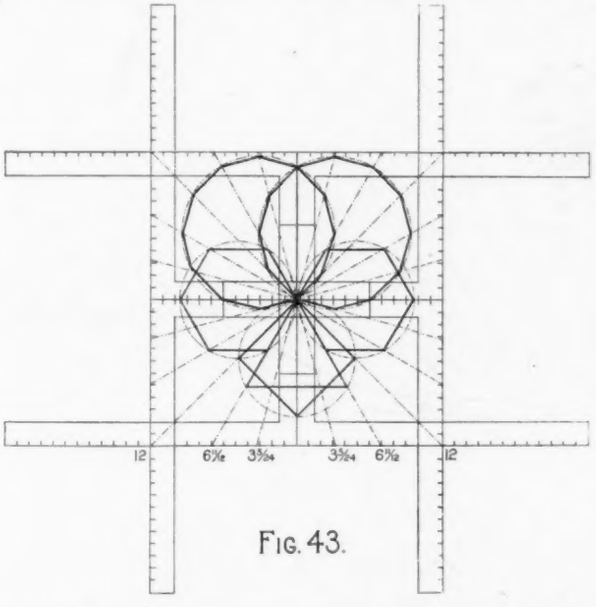


FIG. 43.

set off at 1, 2, 3, etc. Draw lines from these points to the center at 12, as shown.

Now, suppose we wish to draw a heptagon with a twelve-inch inscribed diameter. Set off 5 19-24 on the line 12-1, as at B, and bisect the line 12-B as shown, and where the bisecting line intersects the perpendicular line from 12, as at C, will be the center from which to strike the required radius.

By indefinitely extending the lines 1, 2, 3, etc., below 12, as shown, heptagons with any desired circumscribed radius may be readily determined by simply setting off the radius on the perpendicular line as shown, and where the circle cuts the extended lines determines the length of their chords or sides. In the illustration we have shown three sizes. Proceed in like

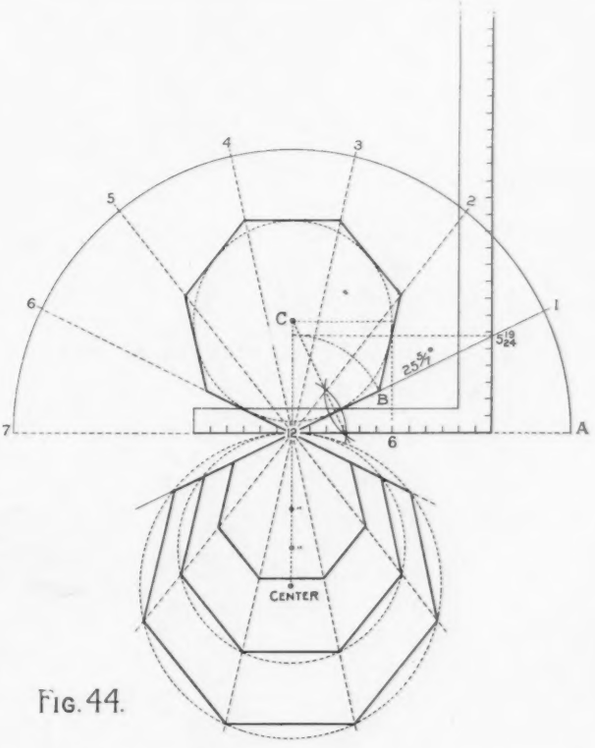


FIG. 44.

manner for any of the other polygons, but using the figures on the blade of the square that give their miters.

Oldest Dwellings in Europe

One of the very earliest human settlements in Europe is Roche Corbon, on the banks of the Loire, seven miles above Tours. Here limestone cliffs stretch for miles and are pigeonholed with caves, which are on different levels and open on to terraces. When the rest of the country was nothing but forest land Roche Corbon was a thriving settlement inhabited by wild skin-clad predecessors of the present cave dwellers. These terraces and caves were formed by the action of mighty rivers, and during the glacial period, when the climate of that portion of France was very severe, man drove out the bears and hyenas and took refuge in these natural shelters, which faced south, and so became human settlements of a primitive sort. Near at hand were the rivers and great forests full of fish and game.

BUILDING CONSTRUCTION

J.A.F. CARDIFF

Building a Home

A SERIES OF ILLUSTRATED ARTICLES COVERING CONSTRUCTION DETAILS IN THE ERECTION OF OUR AMERICAN HOMES—FROM THE LAYING OF THE FOUNDATION TO THE DELIVERY OF THE HOUSE TO THE PAINTER

PLATE XV illustrates the construction of a double hung sash window in a brick cellar wall. The illustration shows the construction so clearly that little explanation seems necessary.

Fig. 57 is a section through the head of the window. The cellar ceiling is shown plastered and the inside of the window is finished to correspond with the rooms on the upper floors. When the window occurs in an unfinished portion of the cellar, the finished woodwork, such as trim, stop bead, stool, and apron, is omitted, and a plain casing put on inside of frame. Space above window head, marked "A," should be filled up with mortar to make a draft-proof job.

Fig. 58 is a section through the meeting rails.

Fig. 59 is a section through the window sill. The space between brickwork and underside of wooden sill, marked "B," should also be filled up with mortar. The inside of brick foundation walls is shown furred with 1 by 2-inch strips and then lathed and plastered.

Fig. 60 is a section through the window jamb. Space marked "C" should be well slushed up with mortar.

Fig. 61 is an isometric view showing a little more clearly the relation of the various members at the window head.

Fig. 62 is an isometric view through the sill of window.

Windows in Frame Walls

Plate XVI illustrates the construction of a double hung sash window in a frame wall. It is what is known as a skeleton frame without a ground casing, and is the kind of window frame that is used in the cheapest grade work.

Principal among its weak constructive features are the omission of grounds to nail trim to, the use of a single sill instead of a sill and sub-sill and the omission of a ground casing without which a true pulley stile cannot be ensured.

A window frame of the better class, including these improvements, will be illustrated in a future number.

Fig. 63 is a section through the head.

Fig. 64 is a section through the jamb.

Fig. 65 is a section through the sill.

Fig. 66 is an isometric view of head.

Fig. 67 is an isometric view of jamb and sill.

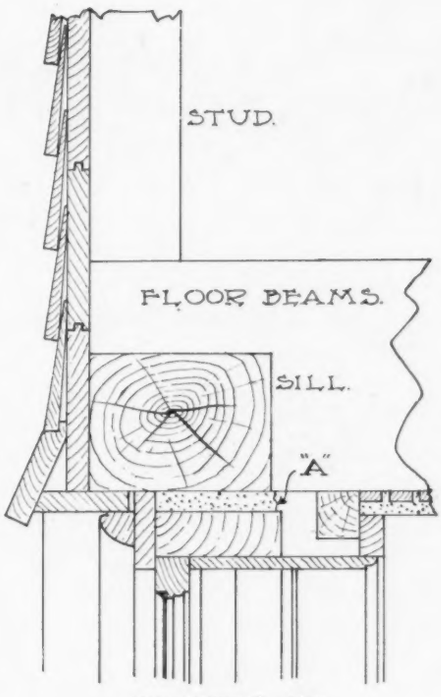
Big Ohio Trees

It is a pretty sentiment that put into the deed, transferring to the Board of Education property on Hicks street, the provision that a giant oak, nearly fourteen feet in circumference, should be preserved carefully. Any fine old tree is worthy of much respect. Cities cannot be too slow to cut down forest monarchs that have survived the change from wilderness to town.

But Ohio has had many trees that made a girth of fourteen feet seem commonplace. The late President Rutherford B. Hayes measured a famous white oak near Sarahsville, Noble county, in 1875, that was 34 feet in circumference. Its trunk towered 78 feet without a bend to the first branches. The top of the magnificent tree was worthy of its trunk. This giant oak was cut down in 1880.

Near Marietta, General Putnam found a black walnut 22 feet in girth. Not far away, in Washington county, there was an elm, much later, which measured 24 feet in circumference two feet from the ground. Another Ohio tree of enormous size was an elm that long stood back of the Methodist Episcopal parsonage, in Chillicothe. It measured over 28 feet in girth a foot from the ground and 22 feet three feet from its base. The top of this magnificent tree covered about 55 square rods, or a third of an acre, roughly speaking.

But the most famous of all Ohio's giant trees was a hollow sycamore that stood in the rich bottom lands of the Scioto River, in what is now Valley township, Scioto county. This tree had a trunk 21 feet in diameter in its greatest dimension. Its circumference exceeded forty feet. The opening into the hollow of the trunk was ten feet wide at the bottom and nine feet high. In June, 1808, thirteen men on horseback rode into the hollow of the trunk, and there was room for two more.—Cleveland Leader.



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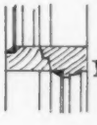

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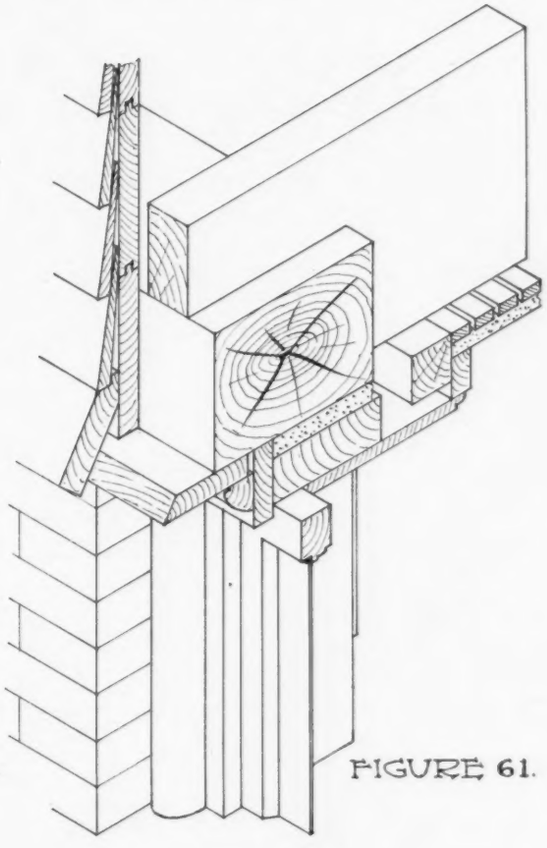

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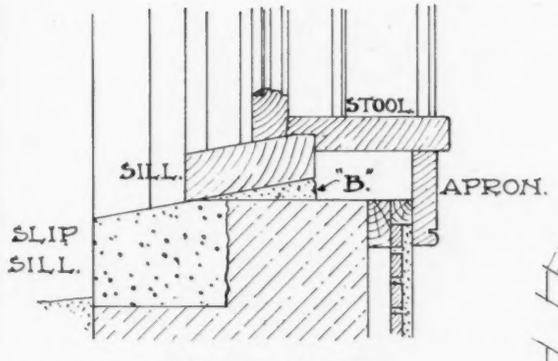
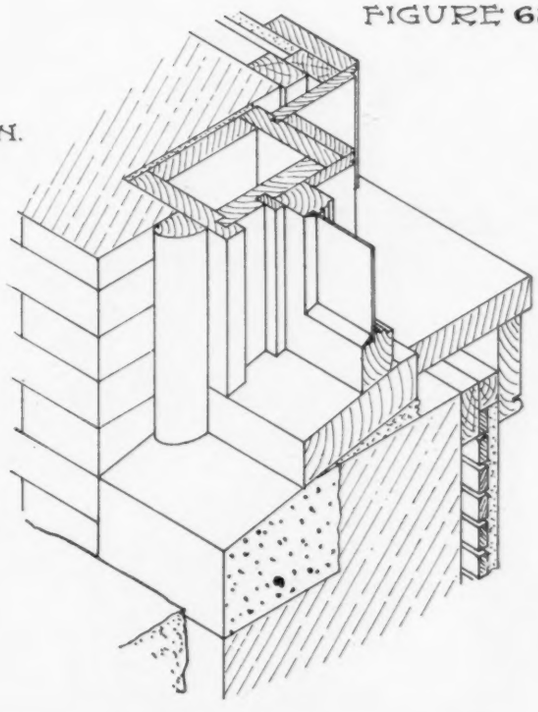


FIGURE 59.

FIGURE 62.



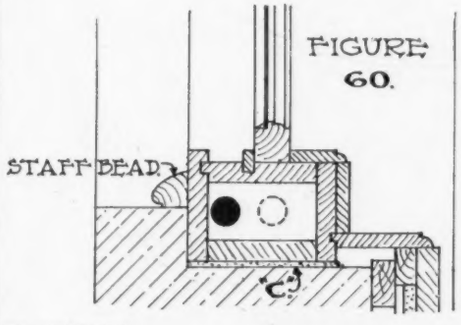


FIGURE 60.

PLATE XV.

WINDOWS.

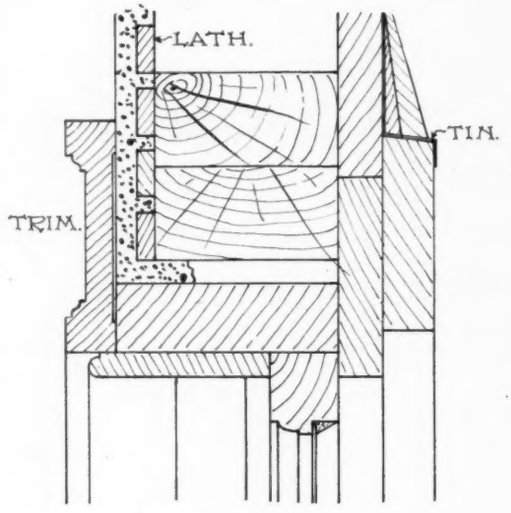
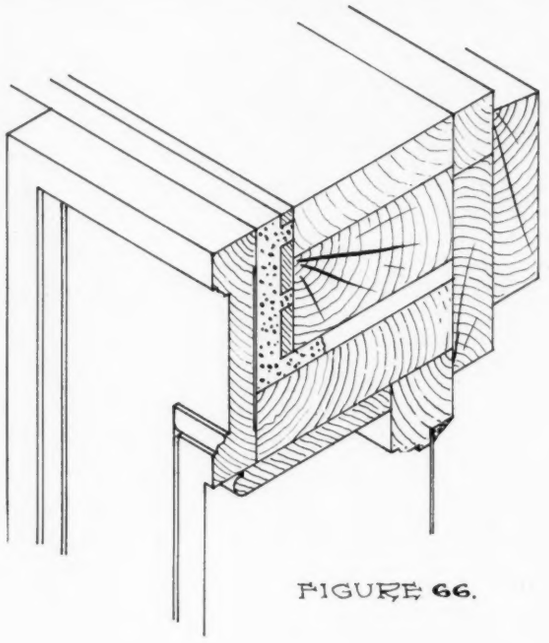


FIGURE 63.



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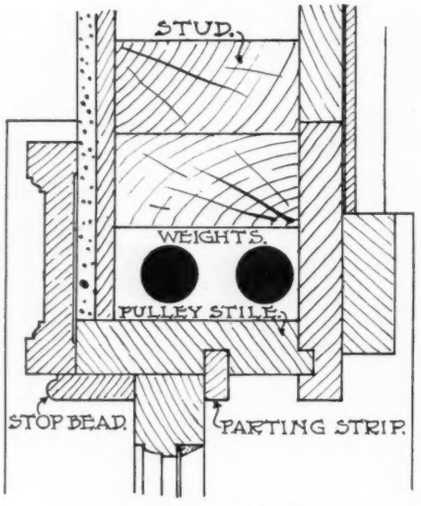


FIGURE 64.

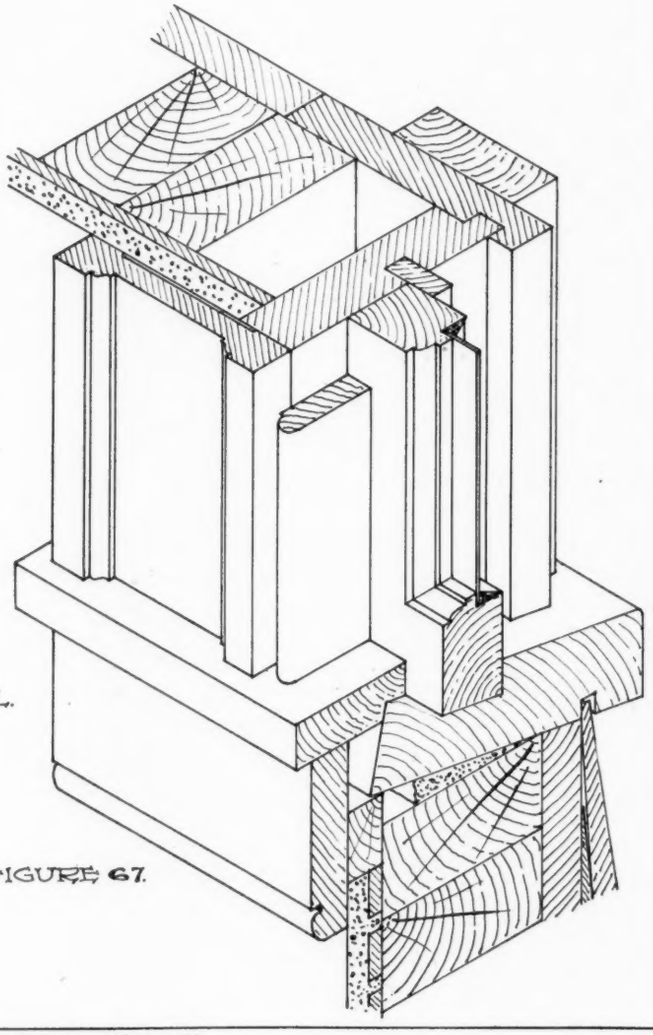


FIGURE 67.

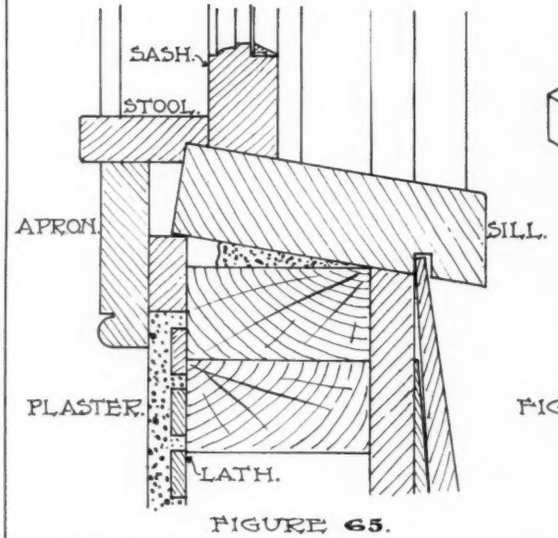


FIGURE 65.

PLATE XVI.

WINDOWS.

PRACTICAL CARPENTRY

Geometrical Handrailing

A SERIES OF ILLUSTRATED ARTICLES ON STAIR BUILDING, USING GEOMETRY AS A BASIS—DEVELOPING THE SECTION OF AN OBTUSE-ANGLED PRISM

By Morris Williams

IN FIG. 21 is shown a plan of a few steps and of a curved handrail at the bottom of a stairway, the curve being less than a quarter circle, and the angle between the tangents obtuse.

The geometrical problem that presents itself in this

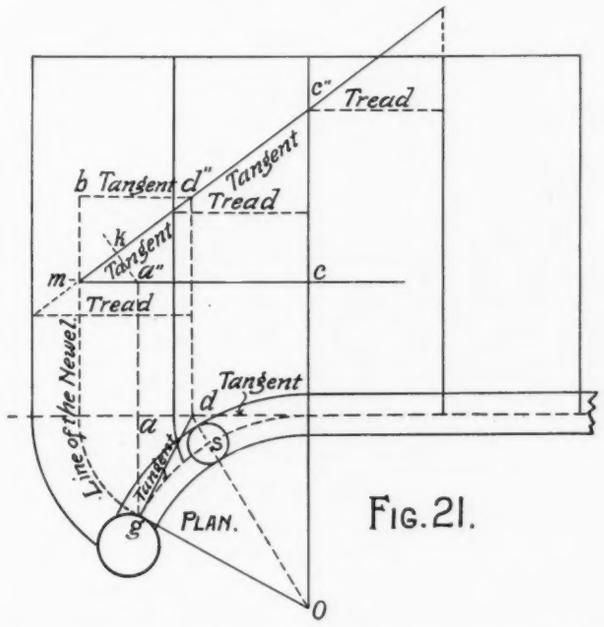


FIG. 21.

example is that of developing the section of an obtuse angle prism either when an oblique cut is made through two of its sides, or to one of its sides; and a level cut made through the other; depending on the arrangement as to how the rail is to intersect the newel; whether at an angle equal to the pitch of the straight flight, or at right angles, which would be the case if the rail is rampt.

As the two arrangements occur in practice the solution of the problem under the two different conditions will be taken up in this article and the same applied to develop a face mold for a wreath over and above the curve shown in the figure.

The triangle *g c c"* may be considered as representing the unfolded sides of a prism; the line *8 c"* indicating the angle at which the sectional cut through the prism is made.

In Fig. 22 the elevation *m c c"* is shown to be a reproduction of the triangle *g c c"* in Fig. 21 and to represent the unfolded sides of a prism. The base of the prism in Fig. 22 is shown at *o 8 d c*, and to be a reproduction of the plan in Fig. 21.

The problem to be solved in this figure is that of developing the form of the section when a prism having this kind of a plan is cut through two of its sides to the angle shown at *m d c*.

From *8* draw the line *8 a;* and from *a* draw *a k b* square to the pitch line *m c"*. Place one leg of the compasses in *d*, extend the other to *m*, turn over to *b*, and connect *b d*.

Now draw the line from *o* in the plan, to *d;* upon *d* erect *d d"*; from *d"* draw the line *d" o* parallel to *m b*, and make it equal in length to *o d* in the plan; connect *b o* and *o c"*, thus completing the development of the section as shown at *b d" c" o*.

If the curve in the plan is considered as representing the plan center of a rail as shown at *8 c* in Fig. 21; the curve shown in the section, then, will represent the developed center of a wreath.

To further help the understanding of the method here demonstrated to develop a section, as well as its adaptability to the development of a face mold for a

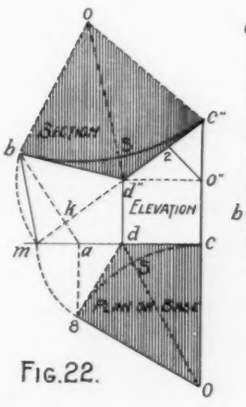


FIG. 22.

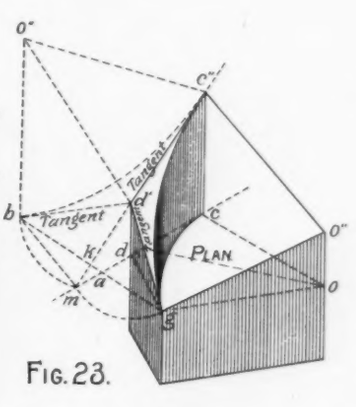


FIG. 23.

handrail we present the isometric view shown in Fig. 23, which clearly illustrates the plan and section of the prism, the plan curve of the rail and its development, and also an insight into the meaning of every

point and line made use of in the solution of the problem under consideration. All the reference letters in the two figures will be found to correspond and those in the section to be standing plumb above similar letters in the plan, indicating the relative height of each point in the section above those in the plan, thus defining the inclination of the plane and the form of the section.

In Fig. 24 is shown how the solution is applied to develop the form of a face mold.

Draw the line *a m* at a distance from the edge of

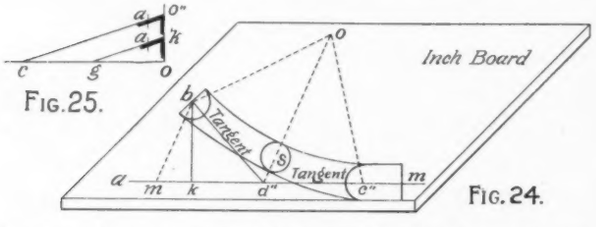


FIG. 25. FIG. 24.

the board equal to half the width of the rail and transfer to it the points *m k d″ c″* either from the pitch line in Fig. 21 or in Fig. 22.

Upon *k* draw the perpendicular line *k b;* make *b d″* equal to *d″ m;* connect *b m* as shown by the dotted line. From *d″* draw the line *d″ o* parallel to the line *m b* and equal in length to *o d* in the plan Fig. 22; connect *o b* and *o c″*. Thus is formed the development of the section which is similar to the section shown in Fig. 22, the reference letters in both figures corresponding.

In Fig. 24 the two sides *b d″* and *d″ c″* of the section represent the tangents of the face mold and the angle between the two that of the angle required between the tangents to square the joints.

To draw the curve make *d s* equal to *d s* shown in

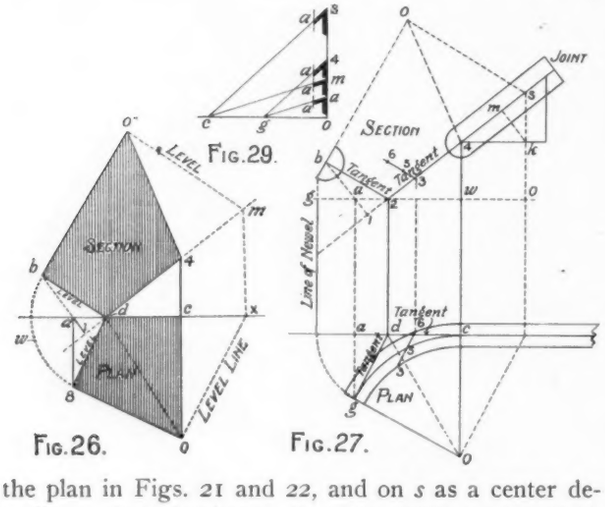


FIG. 26. FIG. 29. FIG. 27.

the plan in Figs. 21 and 22, and on *s* as a center describe a circle having a diameter equal to the width of the straight rail. This determines the width of the mold at this point.

To determine the width at each end it will be necessary to refer to the bevel shown in Fig. 25 where *a o″* and *a k* indicate half the width the mold will have to be; therefore place on each side of *b* and of *c″* the distance *a o″* or *a k* and draw the curves by connecting the three points thus found for both inside and outside curve.

The joint at each end *b* and *c″* are made square to the tangents, thus completing the face mold for the wreath over and above the plan shown in Fig. 21 when the two tangents are equally inclined.

The two bevels in Fig. 25 are shown to be equal and are presented to exhibit two different methods to find the same bevel, both methods being applicable to all cases and should be intelligently studied and understood, as the one may be used to test the correctness of the other, which in cases of extreme difficulty that sometimes occur in practice will be found of great value.

The two methods to find the bevels are as follows:

First Method.—Draw two lines at right angles to one another as shown in Fig. 25. Make *o c* equal *o c″* of the plan, which represents the radius of the center line of rail shown in the plan in Figs. 21 and 22; make *o o″* equal to *o z* in Fig. 22 and connect *o″ c;* the bevel will be at *o″*.

Second Method.—Make *o g* equal to *g a* in either of

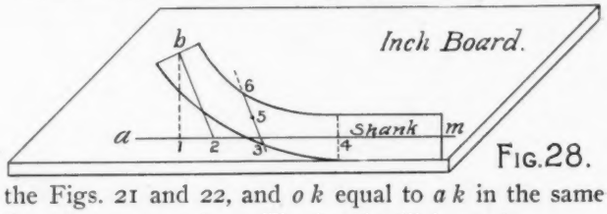


FIG. 28.

the Figs. 21 and 22, and *o k* equal to *a k* in the same figures; connect *k g*. The bevel will be at *k*.

The next problem to be solved is that of developing the section of an acute angle prism when cut oblique through one side and level through the other side.

Let *o 8 d c* in Fig. 26 represent the plan of the prism; and the pitch line *d 4* the oblique angle cut through the side *d c;* the cut through the side *8 d* being level, that is, parallel to the base.

Continue the line *d 4* to *I* and draw the line *g a*.

From *I* and through *a* draw the line *1 a b* square to the pitch line *d 4;* place one leg of the compasses in *d;* extend the other to *g;* revolve point *8* to *b;* as shown by the dotted arc *8 w b*, and connect *b d*.

From *o* in the plan draw the dotted level line *o x* parallel to the plan level tangent *8 d;* upon *x* erect *x m;* from *m* draw the dotted level line *m o″* parallel to the level line *b d;* connect *o″ b* and *o″ 4*, thus completing the development of the section shown outlined by the letters *o″ b d* and the figure *4*.

In Fig. 27 is shown how the solution to develop this section is applied to handrailing.

Let *g d* in Fig. 27 represent the plan line of a level tangent, and *d c* the plan line of an inclined tangent, the inclination to equal that of the line shown at *d 4* in Fig. 26; complete the plan as shown by connecting *8* and *c* to *o* the center wherefrom the plan rail is described.

It will be noticed that we have a similar plan in

this figure to that shown in Fig. 26; hence, the developed section will be similar, which is shown to coincide in all details to the one developed in Fig. 26.

In Fig. 28 is shown how simple it is to draw the face mold once the solution of developing the section is understood.

A competent stairbuilder would get out his mold with no other lines than is shown in this figure. The line *a b* is gauged at a distance from the edge of the board equal to half the width of the mold, and upon it the points *1 2 3 4* are transferred from Fig. 27.

On point *1* the perpendicular line *1 b* is drawn, and made equal in length to *1 b* in Fig. 27; then points *b* and *2* are connected and a line from *3* drawn parallel to *b 2*.

On this last line the points *5* and *6* are placed, taken from the plan in Fig. 27.

The points *3* and *6* determine the width of the mold at this point. The width at each end is determined by placing on each side of *c* the distance *a a* shown in Fig. 29, and on each side of *b* the distance *a s* shown in the same figure.

The bevels shown in Fig. 29 are found as follows: Make *o c* equal the radius of the plan center of rail, and *o s* to *o s* in Fig. 27.

The bevel at *s* is to be applied to the end *b* of the wreath.

Another method to find the same bevel is to make *o g* equal to *a g* in the plan Fig. 27, and *o 4* equal to *w 4* in the same figure.

To find the bevel for the end *c* of the wreath: Make *o m* equal to *k m*, Fig. 27; connect *m c*.

Another method to find the same bevel: Make *o a* equal to *1 a*, Fig. 27, and connect *a g*.

Cornice and Gutter Construction

SHOWING SEVERAL WAYS OF CONSTRUCTING SAME—IMPORTANCE OF GOOD GUTTERS ON BUILDINGS—AMOUNT OF FALL TO GIVE THEM

By Dwight L. Stoddard

THERE is nothing that adds to the appearance of a building like the cornice. A building with beautiful walls and a good roof is indeed the kind every one should have, yet that kind of a building with a poorly constructed cornice would mar the effect of the entire building.

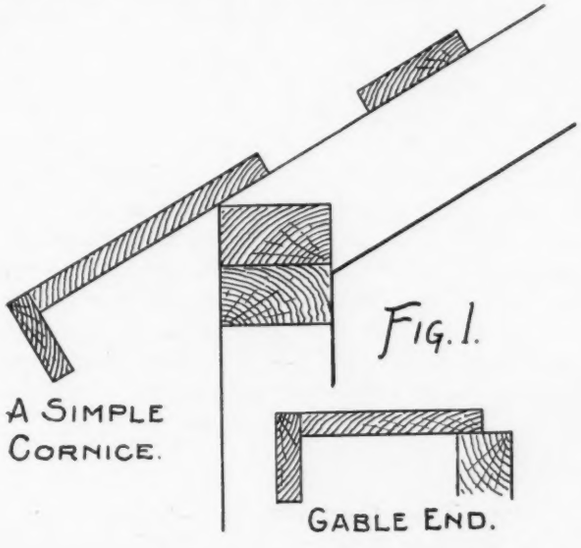


FIG. 1.

A cornice to be well made and look nice and pleasing to the eye, does not necessarily need to always be a massive or expensive one, in fact for some buildings it should be the reverse.

While the gutter is nearly (so to speak) out of sight, to the human eye, yet where the human eye can see it there is nothing that looks worse or entirely racks the whole human frame more, than to see one standing full of water, and that kind, I am sorry to say, is only too common. Not only does the sight of that kind rack the human frame, but in time, and only too short a time, it wrecks the frame of the building as well.

Fig. 1 illustrates the simplest cornice I know of, and is, as you see, put on (where the rafter does not project beyond the plate) by simply nailing a board at top edge to the plate and rafters and let the bottom edge project, and at the gable end a board nailed one edge at center of rafter and the other edge give the projecting. Let the bottom cornice project and cut the end cornice at top edge of it and brake a facia board around the whole cornice and it makes a very good, tight and cheap cornice and answers very well for small light work, where the projection does not have to be but a few inches. Of course this kind of

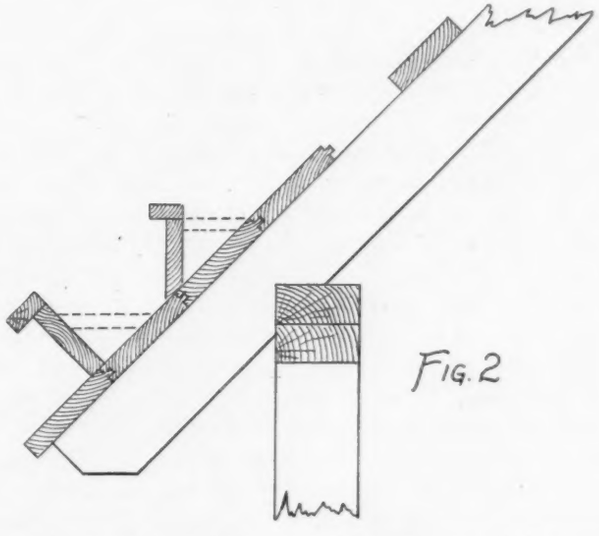


FIG. 2

cornice on a large house would not do at all, but on cheap outbuildings, such as coal shed, hen houses, etc., it answers very nicely. This kind is generally used on

only those small, cheap buildings and used without gutter, although of course they could put a gutter on them.

Fig. 2 illustrates what is called rafter finish, and used to be railroaded through this country on all kinds of buildings, and while it was claimed to be cheap, many very expensive ones were put on with several members, molds, brackets, etc.

I have illustrated the two ways of putting it on; the lower one is generally the best, as the drip drops

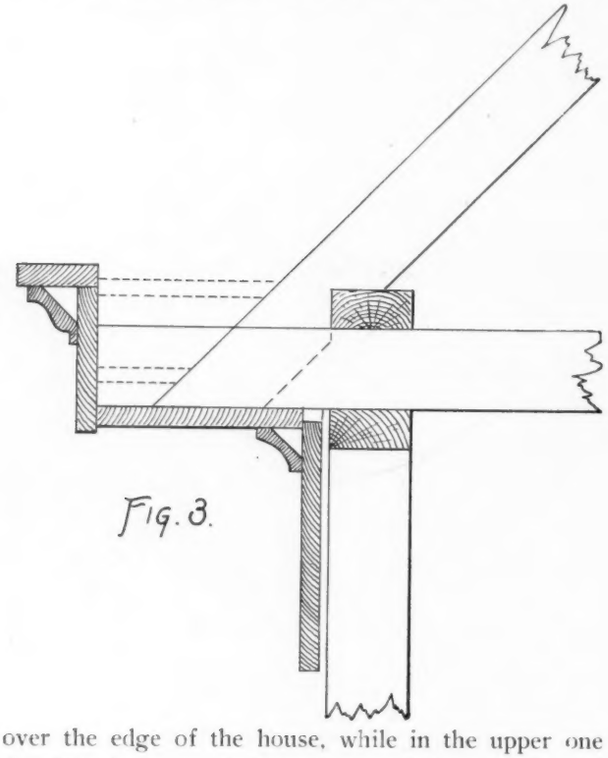


Fig. 3.

over the edge of the house, while in the upper one the drip drops on the lower part of the cornice and in a few years a nice house with expensive cornice, with molds and brackets, is all rotted away.

The main objection to the lower one is that sometimes in a big rain the water comes down the roof so fast it splashes over the gutter, and to overcome that the gutter is set at an angle between the two here shown.

The fall in these gutters is sometimes made entirely by putting one end up higher on the roof than the other, though to put them level and put a bottom board in (as dotted lines show) near the top of gutter and tapering down to nothing at the down spout makes a better appearing job, yet for a very long gutter it is well to do both, put one end higher than the other and put the bottom board in also.

It is much better to construct a gutter and give it all the fall you think necessary, and then add an inch more rather than make it an inch less. Give all gutters plenty of fall and you will not only be pleased but the owner of the building will be also. These gutters are sometimes put on top of the shingles. It makes a more lasting job, but is far from ornamental, or convenient, either, when it comes to re-shingling.

Fig. 3 illustrates the real cornice and can be constructed cheaply as illustration shows, or can be made very expensive with many members, mouldings, brackets, etc., and it will practically last forever if a good gutter is kept in it, as there is no part of it exposed.

With dotted lines I have shown both ends of the gutter board in bottom.

Uncle Rural's Opinion on Nursing a Job

(*Continued from page 531.*)

ing more to be said on the subject except to thank Uncle Rural for explaining something that both of them ought to have thought of sooner, but pretty soon there was another little cloud on J. B.'s face and he said, "There is no question but what you are right, Uncle, but Mosby and I were figuring on a good long job there for ourselves during the dull season while there is not much doing, and if we hire a lot of other men—that is, handy men and boys—we can do the work cheaper and make more money as you say, but it will all be over with in a little while, then we will not only be out of a job, but will have trained a lot of men who may come in as our competitors and figure themselves on the next job of this kind that is offered."

"Now, my boy, you are either forgetting some of the things I have told you in the past, or I have forgotten to tell you something, and I will tell you now what you and Mosby have been figuring on there is a full brother to what we call nursing a job, and I want to say to you that nursing a job is a baby act that no full-fledged man should play, and the best way in the world to pave the path to a new job is by doing the one you have in hand promptly and to the best advantage for all concerned, regardless of when and where the next job is to come from. The other matter you bring up, that of training men who may turn around and compete with you, is a subject on which lots can be said, but all I am going to say now is that I have trained up a few people, among them you and Lefty here, and I have never suffered any hurtful competition because of it, and have had no cause for regret."

The Kitchen in China

"In China everything seems to us to go by contrary, and the front part of the house is devoted to the kitchen," says a missionary. "Upon entering the house at the front door one is introduced into the culinary department, and so important an adjunct to a household is the kitchen that the population of towns and cities throughout the empire is reckoned by the number of kitchens within the walls. Brick chimneys in China are a thing unheard of, and the smoke from the fire is allowed to roll lazily along the ceiling out into the court or through an aperture made in the roof. The kitchen fire is usually built in a mud stove, for any other kind of a stove is unheard of among the poor classes."

The Making of a Practical Carpenter

THE VARIOUS PRINCIPLES THAT GOVERN ROOF CONSTRUCTION—THE ROOFS THE BUILDER IS CALLED UPON TO CONSTRUCT—METHOD OF TRUSSING THEM

By Frank F. Addison

IT IS scarcely necessary to say that the roof of a building is that covering which is to protect the inhabitants and their property from the effects of the weather, and that in addition to this it should be so constructed that it may shelter the walls, foundation, and fabric generally from snow and rain.

Roofs are of various forms and pitches; the high-pitched roofs are more generally found through the

FIG. 34.

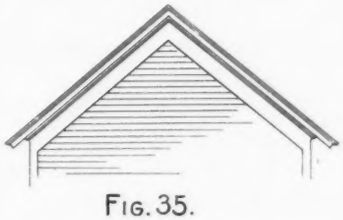


FIG. 35.

north, as they discharge the rain with greater facility and the snow lies on their surface for a much shorter time. When constructed on sound principles, the roof is one of the principal ties of a building, as it binds the exterior walls to the interior and to the partitions; while a badly designed roof will have the tendency to give way or to force the walls out of the perpendicular.

The most simple form of roof is that known as the "lean-to" or "shed-roof." This is illustrated in Fig. 34, and it derives its name from the fact that it is the roof usually used on a small annex or shed built against or leaning against the main building.

The roof most in use and also very simple in its construction is the "saddle-roof," or "gable-roof," as it is often called. This is illustrated in Fig. 35, and

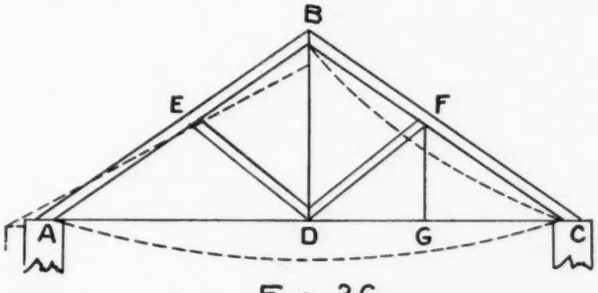


FIG. 36.

shows that the roof has a double slope, and the highest point where they meet is called the ridge of the roof.

Before going into the detailed construction of roofs, it will not be out of place to explain some of the principles involved in roof construction.

In Fig. 36, if AB, CB be two rafters, placed on walls A and C, and meeting in a ridge B; even by their own weight, and much more when loaded, these rafters would have a tendency to spread outwards at A and C, and to sink at B. If this tendency be constrained by a tie established betwixt A and C, and if AB, BC be perfectly rigid, and the tie AC incapable of extension, B will become a fixed point. This, then, is the ordinary couple-roof, in which the tie AC is a third piece of timber, and which may be used for spans of limited extent; but when the span is so great that the tie AC tends to bend downward or sag, by reason of its length, then the conditions of stability obviously become impaired. Now, if from the point B a string or tie be let down and attached to the middle D, of AC, it will evidently be impossible for AC to bend downwards so long as AB, BC remain of the same length; D, therefore, like B, will become a fixed point, if the tie BD be incapable of extension. But the span may be increased, or the size of the rafters AB, CB be diminished, until the latter also have a tendency to sag; and to prevent this, pieces DE, DF remain unaltered in length. Adopting the ordinary meaning of the verb "to truss," as expressing to tie up, we truss or tie up the point D, and the frame ABC is a trussed

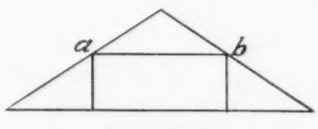


FIG. 37.

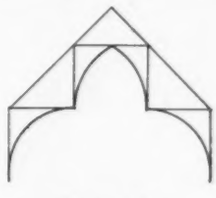


FIG. 38.

frame. In like manner, F being established as a fixed point, G is trussed to it.

In every trussed frame there must obviously be one series of component parts in a state of compression, and the other in a state of extension. The functions of the former can only be filled by pieces which are rigid, while the place of the latter may be supplied by strings. In the diagram, the pieces AB, BC are compressed, and the AC, DB are extended; yet, in general, the tie DB is called a king post, a term which conveys an altogether wrong idea of its duties. Thus we see how the two principal rafters, by their being incapable of compression, and the tie beam by its being incapable of extension, serve, through the means of the king post to establish a fixed point in the center of the void spanned by the roof, which prevents the rafters from bending, and serve in the establishing other fixed points; and a combination of these pieces is called a king post roof.

It is sometimes, however, inconvenient to have the center of the space occupied by the king post, especially where it is necessary to have apartments in the roof. In such case recourse is had to a different manner of trussing. Two suspending posts are used, and

a fourth element is introduced, namely, the straining beam A a b (Fig. 37), extending between the posts. The principle of trussing is the same. The rafters are compressed, and the tie-beam and posts, the latter now called queen posts, are in a state of tension.

In some roofs, for the sake of effect, the tie-beam does not stretch across between the feet of the principals, but is interrupted. In point of fact, although occupying the place of, it does not fill the office of a tie-beam, but acts merely as a bracket attached to the wall (Fig. 38). It is then called a hammer-beam.

The principles of roofs may, therefore, in respect of their construction be divided broadly into two classes: First, those with tie-beams, and second, those without tie-beams.

The first class, those with tie-beams, may be further classified as king-post roofs and queen-post roofs.

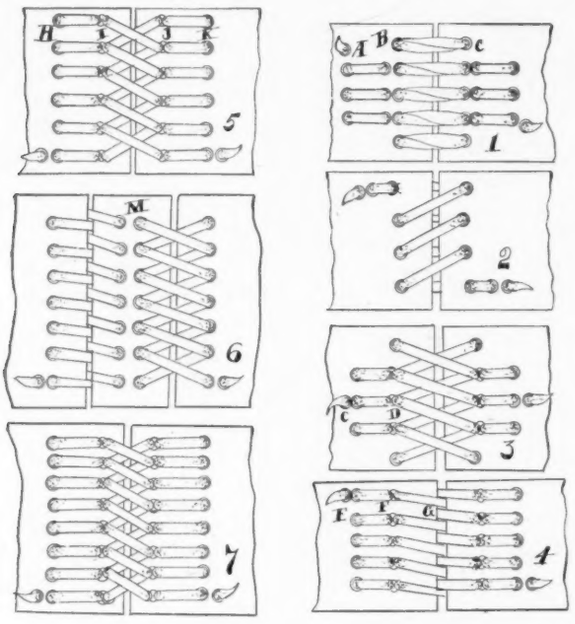
The second class may be arranged as hammer-beam roofs and curved principal roofs.

Having now given such hints regarding the principles of roof construction as will enable the workman to build any ordinary roof intelligently, we will proceed in our next article to describe the methods of their construction.

Belts of the Modern Carpenter Shop

VARIOUS METHODS OF HOW TO PROPERLY LACE A BELT TO WITHSTAND STRAIN—HOW TO INSERT A PIECE OF BELTING IN ORDER TO LENGTHEN IT

I FIND so many first-class, modern machines in the up-to-date carpenter shop, laboring under difficulties due to improper power and transmission, that I am induced to write some things concerning belting. The writer recently took the opportunity to visit some prominent carpentering establishments which had been fitted up with modern designs of



labor-saving machinery, and noticed that some of the excellent machines were seriously handicapped by poorly adjusted lacings of belts, and incorrect settings of the unions. Therefore we have sketched some of the combinations as seen.

In Fig. 1 is a diagram exhibiting a form of lacing for belts as sometimes utilized. There are the rows of holes punched as shown, so that the lace leather can be started at the outer row as at *a*, and then carried to hole *b*, from which point the lace is taken across to *c*. The opposite lace end is similarly begun, and therefore you use two laces for the sewing. You give the two ends a turn from *b* to *c* on the face or the pulley side of the joint, and this twist in the laces does not expose any particular side of the lace to the wear and tear of the frictional contact of the metal wheel surfaces. Hence premature wear is avoided. A lace combined thus will last a very long while on even very hard duty.

Not infrequently I have found unions effected as in Fig. 2. Here we exhibit the ends jointed, and sewn so that the laces zigzag across. The result is that as soon as the belt is put under strain, the butts of the belt pull open and off to one side.

This description of belt sewing is exceedingly flimsy and should, of course, be avoided. Then again I have observed styles of unions kindred to that explained in Fig. 3. This form of lacing is popular in the woodworking establishments. The error is made, however, of having the crosses of the center on the same side of the belting as the straight laces from *c* to *d*. Thus, when the workman desires to follow the established rule of running the straight laces on the wheels and the crosses up he finds that he cannot do so. Therefore either one side or the other is used, as may happen. This lace is made on the plan similar to the diagram in Fig. 1, except that instead of crossing the laces from *b* to *c*, and defining a straight line with said cross or twist, expanding or full crosses are effected as in Fig. 3, so that we secure a combination of actual crosses with the defined straight lines of laces.

Then again there are joints made of the "easily-bent" order, termed by some, "combination hinged" splices, as represented in Fig. 4. The project in making this form of union is to produce a means by which there may be a hinge-like motion secured where the ends of the belting unite. The common line of holes is punched for the first selection of laces, and the secondary line of holes is likewise put in for the additional lacing as exhibited. We start the lacing with a single end at one time, at *e*. Thence we proceed to *f* and then onward to the space prevailing between the two ends of the leather belt. Here we drop the lace end down between the juncture and come up from *g* through the corresponding hole of the opposite belt

end. Then we repeat the sewing of the lace end on this opposite side, and return across. The operation is simply repeated until the entire distance across the leather belting is covered. The result is that quite a powerful union has been produced, and yet there is much flexibility at the common center, for the joint can be bent very readily and easily. This type of lacing is calculated for surface on woodworking machinery where there are wheels of small diameter operated at high speed.

Referring to some larger and heavier forms of belt lacings, we find that the patterns next exhibited are used with good results. In the lacing of the heavy belt, precaution has to be taken to get the joints even, and plenty of holes punched so as to freely equalize the strain of the laces on the ends. Hence we find that most all of the double belts are laced with double rows of sewings.

Fig. 5 is a diagram of one form of jointing the wide and heavy belt. It is similar to the plan used in Fig. 3, only that in this case provisions are made for a heavier strain on the joint. A more thorough distribution of the lacing material is assured by punching the extra row of holes to the full extent of the sewing, completely across from side to side. The lace is started at the lettered side of the union, and we work with both the ends. The cross is first shaped from *i* to *j*, and then to add to the restraining ability of the joint, the extra lap is made on either side to *h* and to *k* and back, previous to forming the cross to the next insertion. This mode of procedure is followed completely across the union, making it very secure.

Once in a while it happens that the belt is too short. Perhaps the continual breaking of the lacings has ruined the ends of the leather belts so that in order to make a proper joint it is necessary to cut off some of the ragged leather edges. This of course shortens the belt just so much. Therefore a plan of introducing a piece of leather, as in Fig. 6, is adopted. If the inserted piece is adjusted correctly but little trouble will be experienced with it. I have seen pieces put in that have outlasted the belt itself. On the other hand I have observed cases of this nature in which the inserted piece has caused a breakage in the joint in a few days. I would first of all get the ends of the leather squared. Then cut out the piece for insertion, and see that this is shaped even too. Then the system of sewing may be started, and any of the modes previously explained may serve. In this case we exhibit the piece closed up with the hinge union and the common crosses.

In the final example of a belt sewing, we exhibit a specimen of the order of the sewings in Figs. 3 and 5 carried out to a more complete jointing. The holes are punched closer and the laces are quite compact as seen. Although much depends upon the character of the sewing of the belt, the fact of the existence of sawdust flyings, shavings, and dryness of atmosphere in the average carpentering establishment, is the direct cause of troubles with many belts. I would brush off the belts often, and now and then apply belting oils, so as to keep the leather soft and pliable.

A Modern Gymnasium

PERSPECTIVE AND FLOOR PLANS SHOWING ARRANGEMENT OF INTERIOR—CAN BE USED IN CONNECTION WITH A SCHOOL OR TOWN—GOOD FEATURES OF SAME

By G. W. Ashby

WE ARE this month illustrating the perspective and plans of a building to be used exclusively as a gymnasium. This has many advantages over one which is located in one part of a school or other building. This can be used in connection with a school or for a town, as it is something which is of value to the young people anywhere. The building is of neat design and is well lighted and ventilated, which is very essential in a building of this nature.

The gymnasium floor proper can be devoted to various athletic contests, such as basket ball, hand ball and other indoor sports, and for the use of the various apparatus with which it is equipped. The running track, which is on the second floor, extends around the inside of the building, leaving an oblong open space in the center so as not to interfere with the trapeze or any similar apparatus which will have to be attached to the ceiling. This running track is eight feet wide on the sides and twelve feet wide at the ends of the building and slopes slightly toward the inner side so as to prevent the runners from slipping. The racks on either side are used for various exercises and also for putting up the dumb bells and clubs when not in use.

Lockers for gymnasium suits and slippers are located in the basement, and can be reached by going through either the boys' or girls' toilet rooms.

Shower baths are also located in the toilet rooms, and they are one of the essential things to have in connection with a gymnasium.

Becoming a Contractor

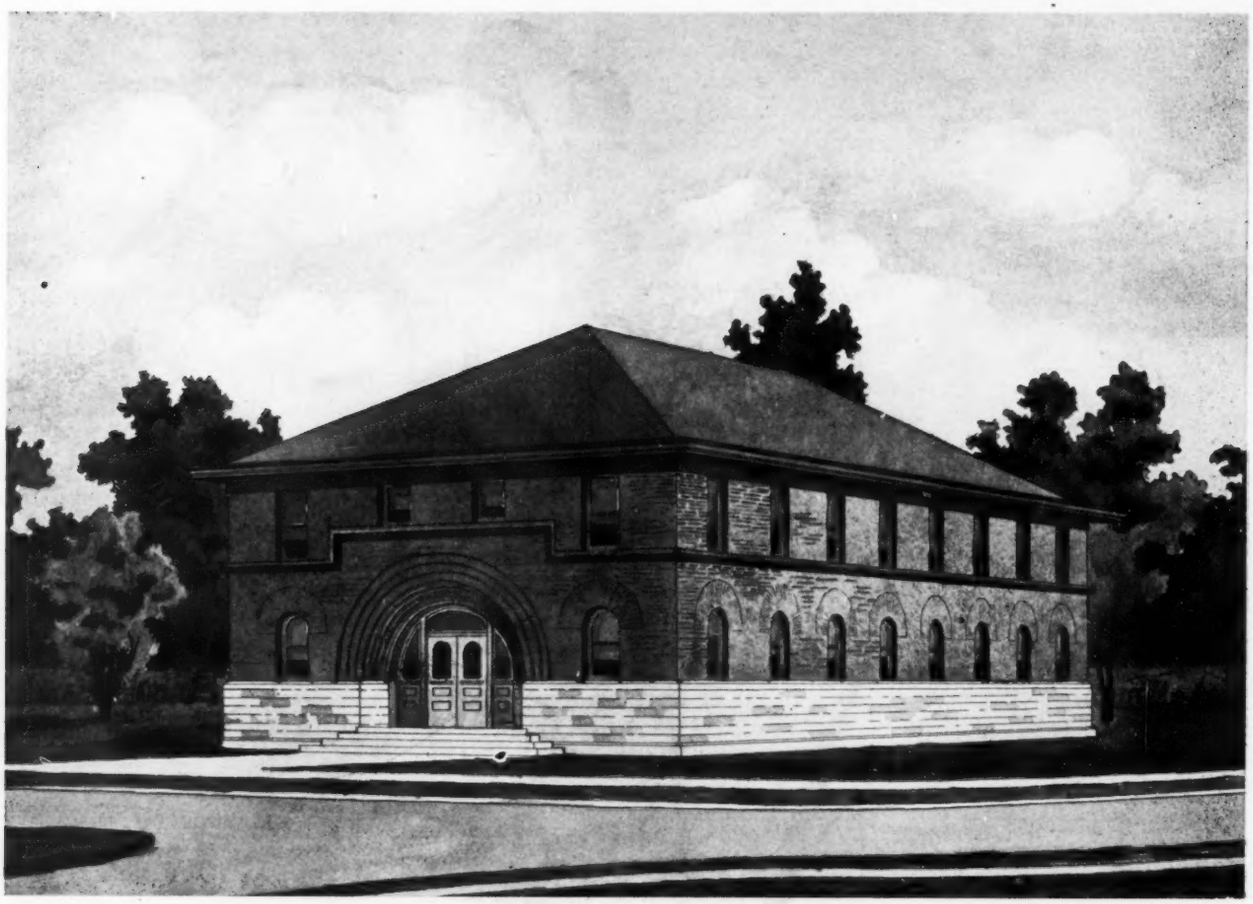
"It's pretty hard to determine a boy's vocation."

"Well, it seems to be pretty well settled that my boy is bound to be a contracter."

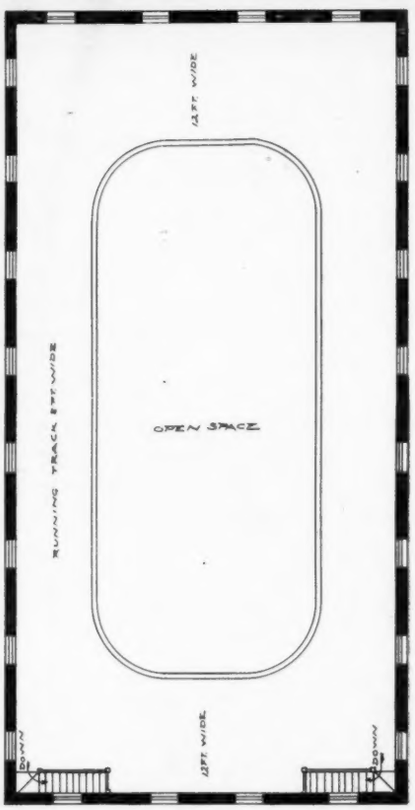
"Showing an aptitude for it already, eh?"

"Well, he contracts nearly everything that comes along; he had the chickenpox and mumps last month, and now he's got the measles."

Experience is the greatest teacher of all, but the cost of tuition in this school is frequently rather exorbitant.



PLAN OF MAIN FLOOR



PLAN OF RUNNING TRACK

Planing Mill Work.

—J. Crow Taylor.—

Caring for Machine Saws

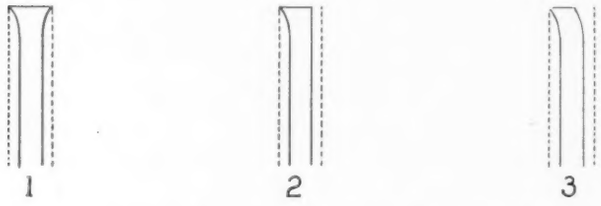
DIFFERENCE IN FILING HAND SAWS AND MACHINE SAWS—THINGS TO BE CONSIDERED IN FITTING THE TEETH OF EACH—HOW TO OBTAIN THE SMOOTHEST WORK

IT MAY sound a little queer at first, but it is a fact just the same, that a course in the practice of caring for machine saws is good training for a carpenter in the matter of caring for his hand saws. It looks as though the care of hand saws ought to be good preliminary training toward qualifying one to care for machine saws, but the trouble is that the average carpenter does not really study saws and sawing until he reaches the point of filing and caring for power-driven saws. There are probably not many carpenters who will admit that they are weak on the real principles of filing and caring for a hand saw, but practically every man in the business will admit that there are hundreds of others who are weak on this point. In short, the filing of hand saws is one of the weakest points in the trade, and there are many good carpenters who have never progressed beyond the A B C's of saw filing, and that is why a little training in the care of machine saws will do the average carpenter good. It forces him to make a study of saws from an analytical standpoint, and by and by he will begin to understand things about the care of hand saws that never occurred to him before.

While there is some similarity between the filing of hand saws and machine saws for the same class of work, there is a much wider difference in detail in this work than there is between the work of caring for hand planes and planer knives. The first wide difference one will encounter in analyzing the work of hand saws and machine saws is in the volume of saw employed to reach through the cut and back up the teeth. In the hand saw we want volume of saw blade to follow in the kerf and act as a guide as well as add a little to the weight and help the saw along a little in taking hold of the wood. When we turn to machine saws, however, it is almost the reverse and we should seek to reduce the volume of saw in use to the smallest practical point. This is partly because we use other things for guides in doing machine sawing, but it is mainly because the saw blade is running at a high speed, and the least bit of friction from its rubbing while in the cut causes the blade to warm up and expand the metal in spots, causing warping and twisting. This is a subject that has been referred to heretofore, but it is worth mentioning again, because it is a very important point in the successful operation of machine saws, especially where those used are very thin. It is this difference in volume of blade which gives the thin band saw in saw mills its great advantage over the oldtime circular, and any carpenter who is operating a small band saw, say a one-inch blade, and a circular rip saw can get a rather striking example of the difference in the volume of saw-blade used in ripping a piece of inch plank on the band saw as compared to the circular saw by measuring the amount of saw-blade contained in the cut in each case. It does not follow from this that the band saw will do less dodging around in the cut than the circular, because there is a wide difference in the thickness, but if your circular saw was made as thin as the band saw then you would see that the band saw would stand up in the cut best. You don't want your circular saws as thin as the band saw, however, but what you do want to do is to make it a point to have the least volume of saw possible engaged in the work. In other words, use saws as small as the work in hand will permit, or else have an adjustable table so that you can raise it up for thin work and not have too much of the saw projecting above the work.

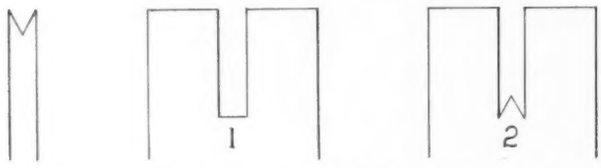
You will find in fitting the teeth of either machine saws or hand saws we have two main objects to consider, one being the cutting points and the other clearance for the saw blade. Both cross cuts and rip saws come under the same head as far as clearance is concerned, in that they must be set or spread at the tooth points so as to cut out a groove or kerf so as to give free passage for the saw. Too much set leads to chattering, and makes rough work, while not enough, that is the same condition which will make a hand saw pinch and bind, will make a machine saw bind in the cut and cause the blade to get warm and run badly by wabbling about. In the cross-cut saw, by reason of the manner in which the teeth are filed, set is obtained by springing the teeth out, just as it is obtained in the practice of hand cross cuts. This same spring set is also used more or less on rip saws and sometimes both spring and swage is used, but the best rip saw tooth is that which is left straight and spread at the point with a swage or upset. Carpenters, from being accustomed to spring setting their rip saws, naturally feel inclined to follow this same practice when they go to using

machine saws, and while it is all right in a way, and they can get along with it, still it is not nearly so good as swage set. In the first place the corner is a sharp one and is not heavy enough, and then it is inclined to wear off from use so that as you keep springing the tooth for more set the tooth wears narrower at the point and round on the outside corner, so that the widest point instead of being right at the point is a little back of it making the saw pull hard and run bad. It only takes a little practice to learn to use the hand swage, and it will only take a little practice in this line,



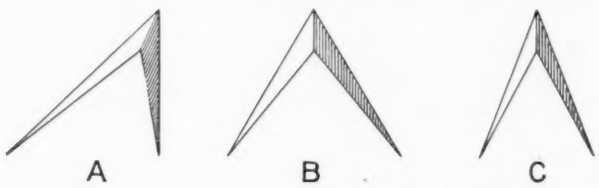
too, to convince the carpenter that this is the ideal set to put into a rip saw.

In connection with this question of set it is in order to bear in mind the fact that your saw must always be in line with the movement of the work being cut, for if it gets the least bit out of line it will display some of the characteristics of not having enough set. Suppose, for example, you have a rip saw table on which is a gauge against which you slide your stock and this gauge is set either by accident or carelessness so that it is farther from the saw at the front than it is at the back. When you undertake to pass stock through, it has the same effect as if you were pushing a wedge against the saw and the gauge which has a taper corresponding to the amount of the gauge is out of alignment. Naturally, therefore, stock will bind on the inside of the saw as if without set, while if the gauge is out of line the reverse way, the back side being farther from the saw than the front, the stock will show a tendency to crawl away from the gauge as you push it through. This matter of proper alignment is a very simple thing when you stop and think it over carefully, but it is a



well-known fact, however, that lack of alignment has caused more saw trouble than any other one thing.

There is room to write a book, and in fact, several books have been written on the subject of saw teeth, going into the various details of length, thickness, space, weight, amount and kind of set, fleam, outline and direction, and depth and outline of throat or gullet. But, for the requirements of the average machine carpenter shop it is not necessary to go into all these matters thoroughly, but it is advisable to consider certain features. For example, to make the smoothest work, no matter whether it is cross-cutting or ripping, we want the smallest teeth possible and lots of them, just as is the case in hand saw practice, and this applies especially to cross cuts. In rip saws the nature of the filing limits the possibilities in the way of small teeth, but in cross cuts for fine work teeth are sometimes made as small as in an ordinary hand saw. In filing these fine cross cuts, the work is practically the same as that fitting up a hand cross cut, but on larger cross cuts where there are heavier teeth there is room for wide variation both in shaping and in filing the teeth. The main work of the cross cut is to sever the fiber of the wood on each side of the kerf simultaneously and generally it is considered that the body of the tooth which does the severing of these fibers will break loose and carry out the material or sawdust between the two cuttings, and as a consequence, practically all the attention given is toward getting as sharp cutting points or corners as possible with just as little body of the tooth to back that up as is permissible. In what might be termed high-grade saw practice, however, provision is also made for clearing the center by the use of special teeth at certain intervals called drags. Many of you have probably seen this idea carried out in the two-man log cross-cut saws of modern type, and the wonder is that it has not been applied more to hand cross



cuts. It would interfere with that well-known test of the evenly filed hand saw, which is accomplished by letting a needle run down over the face of a freshly filed saw, because the idea is, not to leave an uninterrupted groove between the points of the teeth, but to have a certain number of straight teeth in there to cut or drag out the wood as the fibers are severed on each side by the sharp corners of the regular saw teeth. It relieves the body of the teeth from having to scrub or pull out the dust and when the idea is properly carried out it makes the cutting cleaner, easier and faster.

The mission of the rip saw tooth partakes of the characteristics of the work of the mortising chisel and the ideal rip saw tooth can only be obtained on band or cylinder saw. In other words, it is practically impossible to get enough hook or pitch to the tooth of a circular because of its setting. The general shape of the rip saw teeth, however, is a matter that should be left to the saw manufacturer and the machine carpenter can confine his attention to the work of keeping them in order. In the first place, of course, the saw must be kept jointed so that every tooth will do its share of work, then they must be spread evenly, preferably with the swage or upset. It is practically impossible to define just how much a tooth should be spread, because of the varying conditions under which they are operated, but if the operator will bear in mind

that the only purpose of this set is to clear the blade a little experimenting will soon determine him how much to give the saw. It is better, of course, to have a little too much than not enough, and if you want to do smooth work it is imperative to have all teeth spread evenly. This is accomplished with a swage by spreading the teeth a little more than is necessary and then side-dressing either with your file, testing the work with a gauge, or else with a side file which is a gauge in itself. There are regular side files which can be purchased for a small sum of money, or you can take a block of wood, a piece of flat file and three small screws and make one in a few minutes, though some care is necessary in the primary adjustment of the home-made side file to get the piece of flat file to stand exactly in line with the blade of the saw. In filing, file perfectly square and do practically all your work on the front or on the inside of the tooth, working off the back just enough to keep it in shape. If you file perfectly square it is immaterial whether you file all the teeth from one side or half of them from one side and half from the other side, that is, each alternate tooth from a different side, but some people who are not certain of their ability to file square follow the practice of filing from both sides so as to make the imperfections in their work balance up.

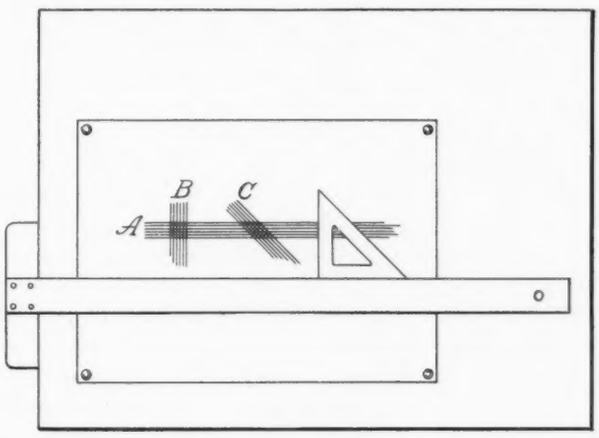
Drawing Lessons for the Carpenter

BEING THE FIRST OF A SERIES OF ARTICLES ON THE PROPER WAY TO LEARN DRAWING—MATERIALS TO USE IN BEGINNING—VALUABLE TO THE CARPENTER

By A. W. Woods

NOW that the long winter evenings are coming on, it occurs to us that there are many readers of the AMERICAN CARPENTER AND BUILDER who would be interested in a short series of drawing lessons for the woodworkers, especially so among the younger men who expect to follow woodworking as a business.

Every carpenter should be able to read at sight a



plan pertaining to his work, and should be able to execute the same intelligently for working purposes. An occasional hour or two spent at this work will be of much help to many of the readers and a little instruction will go a long way in helping the ambitious to get started right in laying the foundation for something better.

Guided by our own experience we will try to give the student the benefit of same and guide him over the rough places that we failed to find. With us it was largely a work of pleasure and well do we remember back in our country home of repairing to the kitchen table to practice drawing—not as given by a professor or as found in text books, but as we found it, so to speak, by hard knocks and plenty of them.

Such was our training when we entered an architect's office. Here we found draughting boards, T squares, angles, scales, drawing instruments, etc., things that we never dreamed of being in existence. Had we been in possession of some of these things and with a little timely instruction our progress would have been much more rapid.

It does not require an expensive outfit for this work. The principal tools needed being a T square, 45° triangle, draughting scale, compass, a medium hard lead pencil, one dozen thumb tacks, a piece of velvet rubber and paper. The latter can be bought by the yard from roll papers at about ten cents per yard. The total cost of these articles need not exceed $2.00 and may be had at most any book store.

A good set of drawing instruments may be had from $3.00 up, but as we wish to conduct these lessons on an economical basis we can for the present get along without them. The carpenter can make his own drawing board, which should be of soft wood so that the thumb tacks will enter easily. The edges should be perfectly square and the sides and ends at right angles with each other. It may be of any size, but for ordinary purposes twenty-four by thirty or thirty-six inches makes a desirable board. The T square, like the board, should be true, and of hard wood, the blade not thicker than an eighth of an inch.

The accompanying illustration shows a drawing board with paper, T square and triangle. By sliding the head of the T square snug up to the board and by using the blade for a rule the lines will always be parallel with each other, as shown at *A*. When long perpendicular lines are wanted, the T square may be used, but for all short lines it is better to use the triangle as shown at *B*. This is done by sliding the triangle along the blade of the T square, and using the edge of the triangle for a rule and the lines will show as at *B*, or if an angle of 45 degrees is wanted, use the slant side of the angle and it will show as at *C*.

In our next we will show how to illustrate the different parts of a frame residence.

Painting the New House

CARE TO BE TAKEN BY THE CARPENTER SO AS NOT TO MAR THE INTERIOR WOODWORK—MOST DURABLE AND APPROPRIATE FINISH FOR THE SEVERAL KINDS OF WOODS COMMONLY USED

SO FAR in this series of articles we have considered only the exterior of the house. It now seems fitting that we should take up the interior work. Although the interior is not exposed to the destructive action of the weather, just as much care is necessary for the proper painting and finishing of interior woodwork as for exterior. In fact, even more care is required, because the interior finish is to be viewed close at hand and comes into direct comparison with the work of the cabinet-maker that is finished in a shop kept at an even temperature and free from dust, conditions almost impossible to obtain in finishing a building, although absolutely essential for the highest grade of finishing, more particularly for varnished and enameled work.

Duty of the Carpenter

Much of the success of the painter in producing a high grade or even a passable job of interior finish depends upon the condition in which the work is delivered to him by the carpenter. In the rush and hurry of modern building it is by no means uncommon for floors to be laid before plastering and for interior trim to be put up before the plaster has thoroughly dried out, and in some cases before the last coat of plaster has been put up. An excuse given for this latter practice is that this avoids patching the plaster on the last coat in order to remedy breaks and bruises caused by the carelessness of the woodworkers in putting up the standing finish. As every builder knows, it is almost impossible to patch plaster so that in certain lights the patch will not stand out prominently, and this is especially true of sand finish plaster.

With that carelessness of the work of other mechanics that the workmen in each separate branch of the building trades seem to acquire, the carpenter cares little for the finished work of the plasterers, and the plumber still less for the work of either plasterer or carpenter. Each seems to go on the principle that the painter is coming after them and it is his business to cover up all their defects. But, unfortunately, by their carelessness they create conditions which the painter is unable to remedy—even though he does the best he can, and sooner or later the finish shows up poorly because of the poor work of the other mechanics. The owner fails to recognize this fact, and remembering that so and so did the painting blames him for stains on the woodwork or cracking or peeling varnish, even though the cause for these conditions is due to someone else.

If inside door frames are set before the plastering is finished or if the trim is put up before the final coat of plaster, the wet mortar will cause stains in the wood that is almost impossible to remove or obliterate by subsequent treatment. But if conditions are such that it is absolutely necessary to do this, then the woodwork should first be given a glue or varnish size, or it should be primed if it is to be finished in paint or enamel, or it should be filled with paste or liquid filler if it is to have a varnish finish. If the woodwork is of white pine or other soft wood, which it is intended to stain, either a coat of oil stain should be given, or if water or spirit stain is to be used this should be applied and protected with a coat of shellac. A strip should be nailed to the face of the frames to prevent them from scarring or defacement, and it would be well, if possible, to cover all the finished woodwork with building paper before the final coat of plastering is given.

So much moisture is contained in even apparently dry plaster and is soaked up by the kiln dried lumber used in finishing that it would be well if a heavy coat of rough paint were applied to the back of all standing trim before it is put in place. A coat of oil or shellac would answer where the wood is to be finished natural and it is desired to avoid any possible chance of staining the edge of the finish. This back painting prevents the moisture from the wet plaster being absorbed by the wood.

If the finished floor is laid before plastering, after it has been planed and sandpapered, the cracks should be filled with putty composed of two-thirds whiting and one-third white lead mixed with pure linseed oil, or, better still, with one of the prepared crack and crevice fillers that are to be found on the market, and which are not so likely to be affected by the shrinkage of the wood as putty. If the floor is of hardwood, it

should now receive a coat of paste filler well rubbed in, followed by a thin coat of shellac. If the floors are of soft wood they should receive a thin coat of shellac or a coat of oil stain followed by a thin coat of shellac. When this has become perfectly dry, the floors should be covered with heavy building paper or carpet lining, tacked down well, to prevent injury or marring. This covering should remain on the floor till all the other painting and wood finishing in the room is completed, when the floor covering is to be removed and the floor is to be finished last. It is far better, however, and amply repays the additional cost, if a rough floor is laid before plastering, and if the finished floor is not put down until after the plastering is completed.

Very many carpenters are far from careful in putting up standing finish and allow the mouldings to become dented or marred by careless use of the hammer or by allowing the finished woodwork to be struck by boards and the like. These dents and bruises, though barely perceptible on the unfinished wood, show much more plainly when the work has been painted or varnished, especially where a gloss finish is employed. Moreover it is almost impossible for the painter to completely remove them. More care on the part of the carpenters to avoid marring the finished woodwork, in the first place, would make it possible for the painter to do better work and to give better satisfaction to the owner.

Before turning the work over to the painter to finish the carpenter should sweep out the room, removing all blocks, shavings and the like, and should turn over as much of the building at a time as possible. It is unreasonable to expect a painter to make even a half-way decent job of interior painting or varnishing if he is compelled to work in a room where other mechanics are at work and where the air is full of dust. The soft and tacky surface of partly dry paint or varnish catches and holds the flying dust, making a rough surface that cannot be made smooth by subsequent sandpapering or polishing.

After the carpenter has finished cleaning up the woodwork and has delivered it to the painter, it is still far from being ready for finishing. The carpenter's idea of cleanliness and smoothness is very different from that of the painter. To do a good job, the painter must go over the work with fine sandpaper or steel wool, removing all pencil marks and dirt from the woodwork and making it as smooth as possible. He should then sweep the room clean and thoroughly and carefully dust the standing trim, and when this is finished the work is ready for painting or varnishing. We are assuming, of course, that the trim has been put up after the plastering and that no preliminary priming has been done.

Interior Painted Work

From the very start, more care is required with interior painting than with exterior. No greater mistake can be made than that of using second-grade or combination leads or ochre for priming. No pigment should be used, but the finest ground and perfectly pure white lead. In case the wood is discolored the priming coat may be tinted with pure lamp black to a very light lead color, the succeeding coats being white, if that is to be the color of the finish, or tinted as may be required.

Before priming, all knots and sappy places in the wood must be coated with pure grain alcohol shellac. Wood alcohol shellac or the cheap shellac varnishes that are largely adulterated with rosin will almost always cause peeling or yellow spots and will give no end of trouble. For a first-class job of interior painting the entire woodwork should be given a light coat of shellac. This not only serves to prevent the knots and sappy places from staining the paint, but it acts as a surfacer, filling the soft, open pored parts of the wood, so that when the paint is applied it will dry alike over its entire surface. Where cost is an object a coat of good liquid filler is recommended instead of shellac, by many painters as a suction stopper. But cheap liquid fillers made of rosin varnish doped with a chemical to give them the appearance of being made with a pigment base should be avoided, as they will be sure to cause trouble. In buying liquid fillers it is well to remember that it is impossible to get a good article unless one is willing to pay a fair price. Copal varnish or hard oil finish, thinned with turpentine, is also used as a size before painting. Where low cost is an object, and it is desired to produce a finish that will wear reasonably well with the fewest number of paint coats, a coat of hot glue size is sometimes given. It must be applied hot and very thin, for if allowed to get cool it will not penetrate into the pores of the wood, but will lie upon the surface, and is liable to break away, causing the paint to check or crack off. But if properly applied and covered with paint or varnish, it will be difficult for ordinary dampness to affect it.

We are now ready for the paint, and although many specifications continue to call for "pure white lead and linseed oil to tints as directed," the intelligent, practical painter knows very well that if this direction were literally followed, the result would be very unsatisfactory, because linseed oil turns yellow when it is not exposed to strong light, and no matter what the pigment may be or what color may be used for tinting, there will be a perceptible change of color tone in all those parts of the room that are not exposed to direct sunlight. This is very easily proved by taking a piece of board and painting it with any white paint—be it pure white lead, pure zinc white or a combination—mixed with pure linseed oil, and after the board has thoroughly dried in the sun, wrapping half of it in black paper or cloth. The board should then be put where it will get direct sunlight every day and kept there for three or four weeks. Unwrap the covering from the board and the unexposed part will be

found quite yellow in tone, while the exposed part will be clear white. If the board had been painted a light blue tint this yellowing of the oil will change it to a pale green. A day or two in the sun will bleach the board back to its original whiteness. Therefore, in interior painting the linseed oil must be more or less replaced by turpentine; the proportions varying with the different coats.

If no shellac or other sizing has been used before priming, the first coat should consist of five or six gallons of linseed oil to two gallons of turpentine as a thinner for one hundred pounds of pure white lead. A large portion of the thinners will sink into the wood, leaving the paint film with very little gloss—or nearly "flat." If an increased amount of turpentine is used, the amount of linseed oil should be decreased. Where the work is to be finished in oil—that is, with a gloss—more oil can be used in the priming than when it is to be finished flat. It must be borne in mind that for interior painting the priming coat should be so proportioned as to dry hard and firm, in order to insure the best results at first and the most satisfactory job when repainting becomes necessary. As interior paint does not have to resist the weather and extremes of temperature, the same degree of elasticity is not required as for exterior painting.

Where a preliminary sizing coat has been given, fairly satisfactory painting can be done with two coats, though three coats makes a better job. One more coat of paint in each case is necessary where painting was begun on the bare wood. The first coat over the primer is usually mixed with about equal proportions of oil and turpentine, and some painters add about half a pint of hard drying or enamel varnish to the gallon of thinners. This means a pure copal varnish —neither rosin varnish nor damar varnish should be used.

After this coat has dried hard all nail holes, cracks or other imperfections should be puttied with pure linseed oil and whiting putty or with a putty composed of equal parts whiting and white lead. Some painters, however, putty before priming, going over the work after priming to fill up any places that have been omitted. The work should then be thoroughly sandpapered or smoothed with steel wool and carefully dusted off.

When only one more coat is to be given the thinners may be mixed either in the proportion of four gallons of linseed oil to one quart of turpentine for gloss work; one-half gallon of oil to two and a half gallons of turpentine for flat finish or one gallon of oil to two gallons of turpentine for egg shell gloss. This is for the ordinary run of work. Where a dead flat finish is desired, the lead should first be washed in turpentine to get rid of the oil and then thinned with turpentine. The best result can be obtained by using pure French zinc ground in bleached linseed oil—or preferably in damar varnish—and thinned with pure turpentine for the last coat. For applying the last coat, where a smooth, even finish is desired, only chiseled pointed varnish brushes should be used on the final coats, while the priming coat should be thoroughly rubbed out with 6-0 round or "pound" brushes. The above directions apply to the last coat, for if more coats are used the primer should be mixed as already directed, and the second coat should dry with an egg shell gloss. Sandpapering is needed after every coat.

Some painters advocate mixing the last coat for a gloss finish with one-third oil, one-third turpentine and one-third good copal varnish. Such a finish will dry hard and can be scrubbed, but it will turn yellow with age.

For a gloss white finish on bare wood, the priming coat should be mixed thin, with one-eighth hard drying varnish to seven-eighths turpentine—the pigment being pure white lead. For the second coat use zinc in damar reduced to working consistency with turpentine, and for third coat use one-third of the second coat mixture and two-thirds enamel varnish. This finish, however, must not be confounded with enamel finish, to which it is much inferior.

Where tints are to be used, the process employed does not differ in any essential from that already described, except that the white lead or zinc white are to be tinted as required with pure tinting colors.

In the foregoing no attempt has been made to give any proportion for the driers that it will be necessary to add to the paint, as this will vary with the temperature and humidity as well as with the brand of driers used. A pure turpentine japan drier should in every case be employed to get satisfactory results.

Substitute for White Lead

British trade journals describe a new white paint, patented in Germany, which is claimed to far excel white lead and other similar products in fineness and smoothness of surface, covering power, permanence and cheapness. It is said to be obtained by saturating burnt lime containing magnesia with a hydro-carbon, and firing until all the carbon is burned. The material is then ground fine and colored ready for treatment with linseed or other saponifiable oils; with mineral oil, also, partial saponification takes places, resulting in a good workable paint. A dolomitic limestone, containing from 20 to 50 per cent of magnesia is said to be best for the purpose, although a limestone having less than 20 per cent may be enriched by adding the desired quantity of magnesia, but not with such good results are are produced by the dolomite. Other pigments can be mixed with the material to produce paints of any required shades. The advantages claimed for the paint are that it dries quickly without driers, is unaffected by light, and not changed by ammonia, sulphureted hydrogen, or sulphurous acid; that the coating hardens like enamel after some months, possesses a dull gloss, does not blister in the sun, and is washable, yet retains its original smoothness.

CEMENT BUILDING CONSTRUCTION

FRED W. HAGLOCH

Concrete and Artificial Stone

DIFFERENCE BETWEEN THESE MATERIALS FULLY EXPLAINED—DEFINITIONS GIVEN FOR TERMS COMMONLY USED IN CONCRETE CONSTRUCTION

MANY builders do not understand the meaning of artificial stone and concrete, as these words are often used for the other. There is perhaps no dictionary that gives more than a general definition of these words. They always give a similar definition for concrete as for artificial stone, yet every builder is fully aware that concrete is a material and artificial stone another, even though he may not be able to intelligently express the distinction.

To properly distinguish these two materials I have been applying the term artificial stone to all cement products where natural quarry products are also appliable, such as caps, sills, steps, flag stone walks, in fact everything made of cement, sand, etc., that displaces natural stone and can be used as natural stone.

Concrete is the use of sand, cement, etc., in construction where natural stone is not readily appliable, such as monolithic (one piece) work, continuous beams, floors and walks. Thus a cement walk made in blocks or flags is, properly speaking, artificial stone, but a walk made continuous of such sized blocks as to be impracticable in natural stone should be known as concrete.

Hollow concrete blocks are not artificial stone as natural hollow stone are not practical, hence, while hollow blocks and natural stone are used for identical purposes (building walls) each make a distinct construction and are not more an imitation of each other than brick or hollow tile.

I have, therefore, been using these words as expressing the following definitions:

Artificial stone—Stone made of composition or plastic materials.

Concrete—A material made of composition or plastic materials.

Hollow blocks—Blocks made of composition or plastic materials with void interiors.

These definitions describe each in a general way, but for the careful student a broader definition is necessary.

Artificial stone—A stone made of sand, aggregates, etc., mixed with adhesive material and hardened, used instead of natural stone.

Concrete—A building material made of sand, cement and aggregates, the entire construction or parts of it are made monolithic.

Hollow concrete blocks—A block used in construction of hollow walls, etc., made of sand, cement, etc.

These definitions are given to enable the builder to make the distinction of the various cement and composition products, and as the industry broadens we find new developments. Within the past week I have been asked if a roofing tile made of sand and cement was concrete or artificial stone, and as I never have heard of natural stone roofing tile I have concluded that concrete roofing tile was the proper name.

Voids—By the word voids we refer to the air space in any building material, such as sand, aggregates and cement; as each contain air, this air space is voids. Concrete, stone and artificial stone all have voids (air spaces), and the large hollow spaces in hollow blocks are voids, but voids is always intended to refer to air spaces which naturally result and not to air space made by the use of cores or other appliances used in making hollow blocks.

The particular feature to be noticed is that natural voids allow the penetration of dampness and made voids (hollow spaces) check penetration.

The following words are also defined as to their use in cement products:

Activity—The chemical action of cement upon the addition of water is known as its activity.

Aggregates—Gravel, crushed stone, etc., in concrete.

Crazing—The checking or cracking of the surface of artificial stone, concrete, etc.

Crystallization—The chemical action of cement when coming in contact with water, commonly known as the setting of cement.

Efflorescence—The formation of a white or grayish crust on the surface of stone, brick, etc.

Firmness—The pulverized condition of cement.

Sand—Stone reduced to small particles, but not to powder.

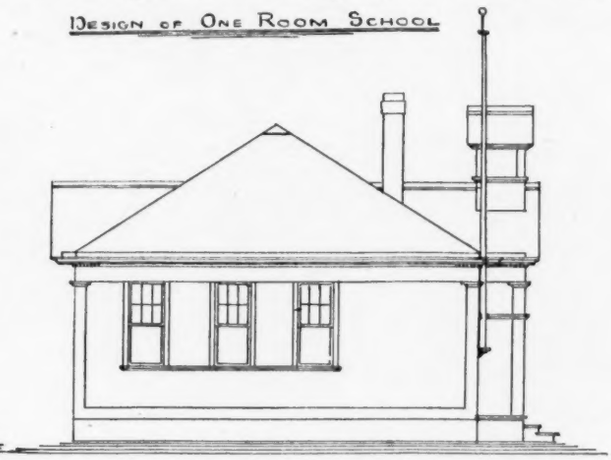
Soakage—The absorption of water by hardened concrete, stone, brick, etc.

Soundness—The non-expansion qualities of cement.

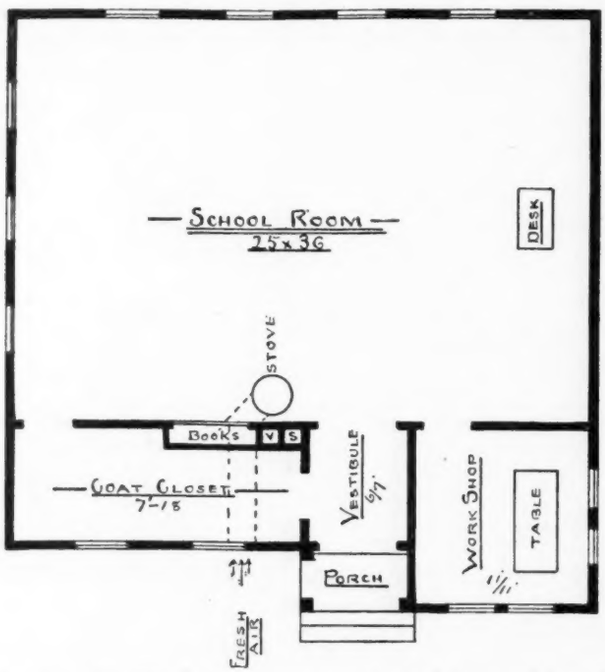
Two Frame School Houses

SHOWING THE PLANS OF A ONE AND A FOUR ROOM SCHOOL—ADAPTABLE FOR DIFFERENT LOCALITIES —GOOD FEATURES IN EACH

THE PLAN for a four-room school house, shown on another page, is for a frame building, and is well arranged for a village or district school. The rooms are 25 by 28 feet in size and with light distributed from two sides of each room. A cloak room 5 by 14½ feet is provided for each of the rooms, so arranged that the pupils can pass in and out from the



school room through the cloak room, thereby avoiding unnecessary steps and confusion. Besides this means of entrance each of the rooms are provided with a door leading directly into the main hall. There are three outside entrances. The main or front entrance leads direct to the main hall while the side entrances are through a vestibule to the hall and also to the



basement. These entrances are desirable in cold and stormy weather, as it prevents a direct cold air draft into the hall.

Another feature about this building that should not be overlooked is that the main part of the steps are on the inside, thereby preventing wet and icy steps in inclement weather.

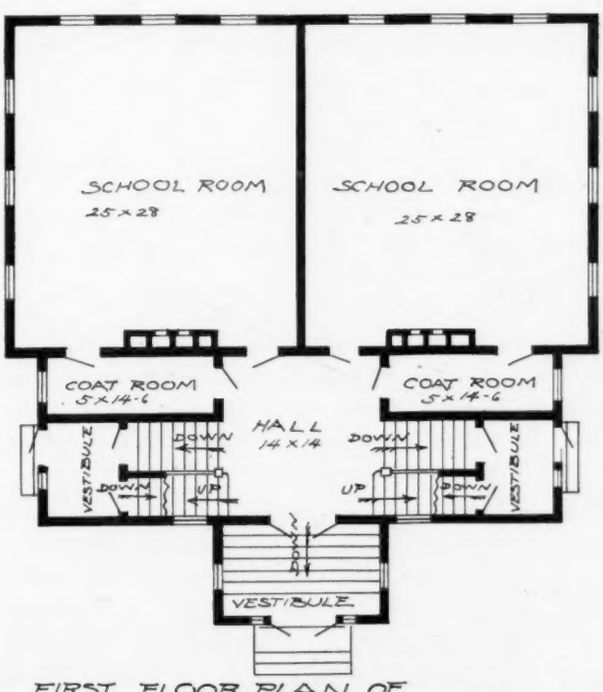
The upper floors are arranged the same as those on the first floor, but are separated by a rolling partition which permits converting the two rooms into one large assembly room, which is desirable on commencement or other gatherings. There is also on this floor a room 12 by 14 feet suitable for the prinicpal's room or business room. The exterior of the building presents a very picturesque appearance and one that would do credit to any community.

One-Room School

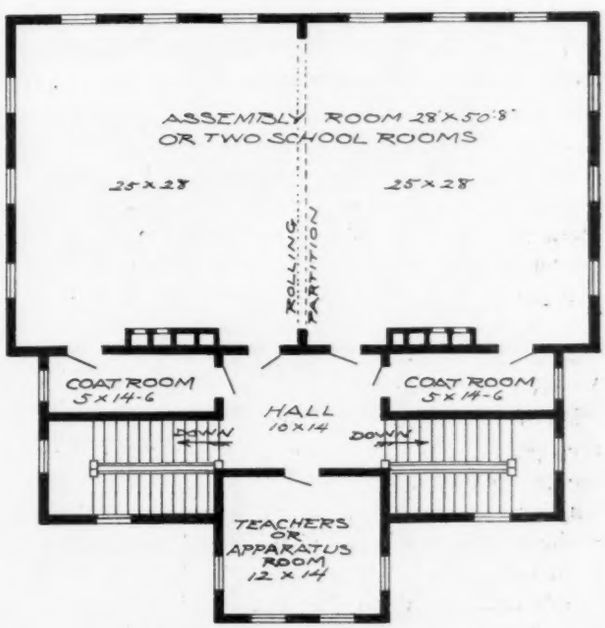
We are herewith showing the elevation and floor plan of a one-room school house. This school has been built in a small town and is considered very excellent from every point of view. The seats are so arranged that the windows are at the left and back of the pupils and up high enough so as not to have outside disturbances interfere with the work. The cloak room is at one side off from the vestibule and the students can pass from the school room through the cloak room and then outdoors. This tends to preserve order, as the students can pass in and out in an orderly manner.

In another corner of the building is a room eleven by eleven feet, which can be used either as a workshop or a store room, where the maps and other necessary things can be put. The school room proper is twenty-five by thirty-six feet, and can accommodate fifty students. The building is of neat design and has met with great favor.

It is a little peculiar, but a fact just the same, that as a rule it is the small things in life that worry great men, while small men fritter away their time worrying over great things with which they have no direct interest.



FIRST FLOOR PLAN OF A FOUR ROOM SCHOOL HOUSE



SECOND FLOOR PLAN OF A FOUR ROOM SCHOOL HOUSE

Plumbing

WM. R. MARSHALL.

Water Supply for Country Homes

A SYSTEM WHEREBY THE HOUSE IS SUPPLIED WITH HARD AND SOFT WATER—HOT WATER ALSO TO BE HAD IN EVERY PART OF HOUSE—USING THE WASTE WATER FROM PUMP

WHILE we are on the subject of "Water Supply Systems for Country Residences," it would probably not be amiss at this time to consider a double or combination system of "Hard and Soft Water Supply for Country Residences."

The old system of placing a storage tank in the attic large enough to hold a week's supply of soft water, and having the neighborhood's "all-around man" come every Saturday morning and pump it full, is being replaced by a more modern installation. One of the great disadvantages of a system of this kind is that it necessitates placing a very large tank in the attic—the defects of which are many, the principle ones being that its great weight necessitates special provision being made for same. Then again, there is always the chance of the supply running short.

Most of the country towns at the present day are supplied with efficient water systems, and it is a very easy matter to install a hydraulic system which supplies hot and cold soft water to every fixture in the house automatically and all of the time. One of the principal objects desired in the hydraulic system is to utilize the waste water from the hydraulic pump so that there will be no loss, which is quite an item when the owner is paying for water at so much per thousand feet.

In the sketch herein shown, we have not endeavored to give you anything new or complicated; it is a very simple and inexpensive system. The city water supply is run direct to the hydraulic pump, and the city water passing through it is piped direct to the fixtures at which cold hard water is desired. In the sketch, we show this pipe run to supply the closet tank and one faucet over the lavatory for drinking purposes in the bathroom; also one faucet over sink and two connections to laundry tub, which is very convenient, as the cold water can be utilized for rinsing purposes, thereby saving a great deal of the soft water. The operation of the same is, that when any of these five faucets are opened, it permits the city water to pass through the pump and at the same time operate the pump, which pumps soft water from the cistern to the tank in the attic from which a pipe is run down to the basement with branches taken off at the different floors to supply cold soft water, hence, to the hot water heater tank, from there on to the heater, back to the tank and around to the different fixtures supplying hot soft water. The return or circular pipe prevents a dead end which necessitates wasting a lot of soft water before the hot water begins to flow.

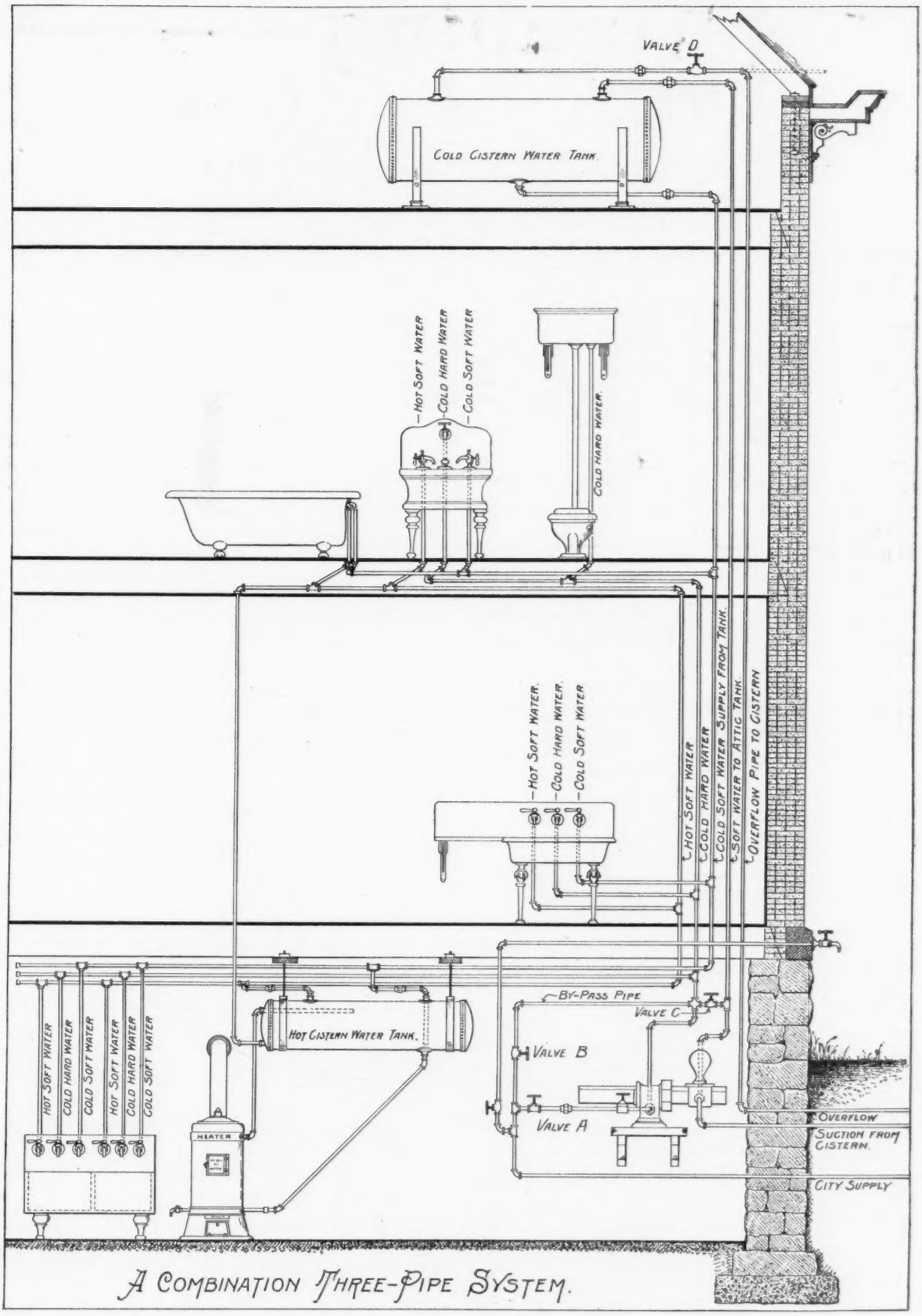
The By-Pass Pipe

We show a method whereby it is possible when the cistern is emptied to fill either the city water supply only with city water, or the entire system without its passing through the pump by the manipulation of three valves, designated as "A," "B" and "C." When the pump is pumping cistern water to the attic tank, valve "B" and "C" are closed, and valve "A" is opened. When the cistern is emptied, and it is desired to fill only the cold city water pipe with water, leave valve "C" closed, close valve "A" and open valve "B," which permits the water to flow into the cold water pipe without passing through the pump. If it is desired to fill the entire system with city water, all that is necessary is to open valve "C," which permits the water to flow up to the attic tank and down through the balance of the system. When this is done, valve "D" on the overflow pipe should be closed after the water begins to overflow, and not before, in which case, the system would become air-bound.

In the sketch we show an overflow pipe from the attic tank returned to cistern within the house. If it is possible to run this overflow pipe out onto the roof so that the overflow will return to the cistern through the eavestrough and downspout pipe to the cistern, it is best to do so, as the cistern water then has a chance to become aerated. The pipe to supply the sill cock or yard hydrant for sprinkling purposes should be taken off at a point before the supply to pump, to prevent the unnecessary work of the pump when sprinkling. In case of a basement closet being installed, a connection can be taken from the city water supply pipe run to laundry tub; three-quarter-inch galvanized iron pipe is sufficiently large enough for all of the main supply pipes with one-half-inch branches to the different fixtures. These hydraulic rams are manufactured so as to work, and work successfully, at as low a pressure as ten pounds.

Lonesome Without It

I look for your paper just the same as I look for my supper. I feel lonesome without it. I don't just see how I can get along without your journal.—Frank Taylor, Yazoo City, Miss.



A COMBINATION THREE-PIPE SYSTEM.

MANUAL TRAINING

IRA S. GRIFFITH

Something the Boys can Make

A COMPLETE DETAILED DESCRIPTION OF HOW TO MAKE A SETTLE—WHY MISSION FURNITURE IS DESIRABLE—SIMPLICITY AND DURABILITY TEND TO MAKE IT POPULAR

IN every furniture store can be found many pieces in what is known as Mission style of furniture, so called because it resembles the furniture found in the old Spanish missions.

Mission furniture has much to commend it. Its simplicity of line, honesty of construction and quaintness of finish makes it deservedly popular with those who have become tired of the highly ornamented pieces so common a few years ago.

There are extremes in everything, and while one would hardly be wise to furnish his house entirely in this heavy style, yet a few odd pieces will help the looks of any room. A whole room might appropriately be furnished in this style.

The settle (Fig. 5) was made by boys about thirteen years of age. The leather cushion was bought at the store, but might have been made by the boys themselves. It is laced together with thongs. The color of the cushion is a dark brown while the lacings are a light or orange yellow. These cushions can be got in almost any color to suit the finish of the wood.

This particular settle was finished by applying a coat of Brown Flemish water stain, slightly diluted with water. After the stain had dried, the wood was sandpapered lightly with fine sandpaper and a coat of dark brown filler put on. Three coats of floor wax gave the finish desired.

Oak was used because of its beautiful grain; chestnut would have done as well.

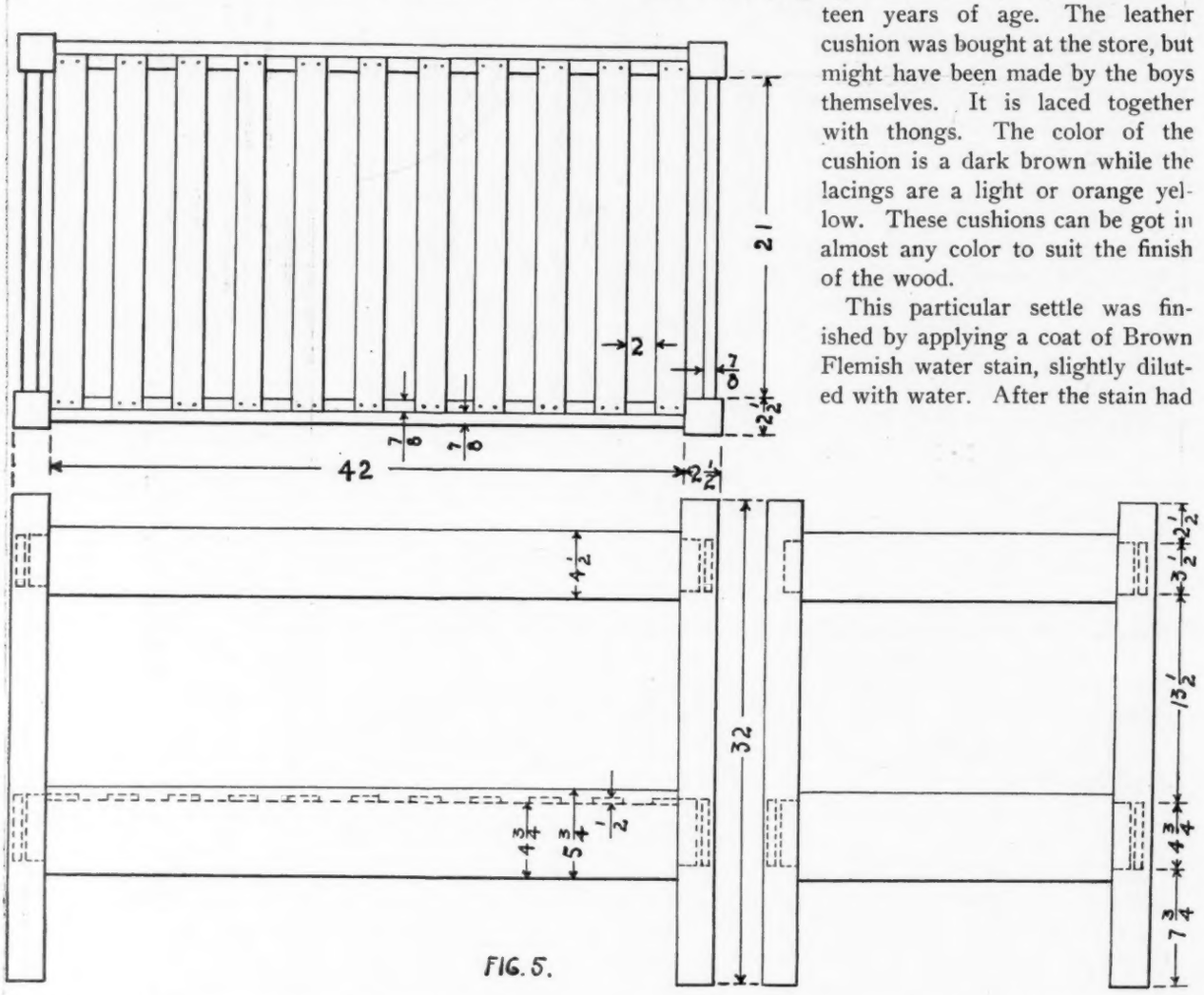


FIG. 5.

The four legs are to be squared up to two and one-half inches in width and thickness by thirty-two inches in length. Too much care cannot be taken in getting the sides square one with another as any inaccuracy will cause trouble when the frame is put together.

Select the joint-edge and working face of every

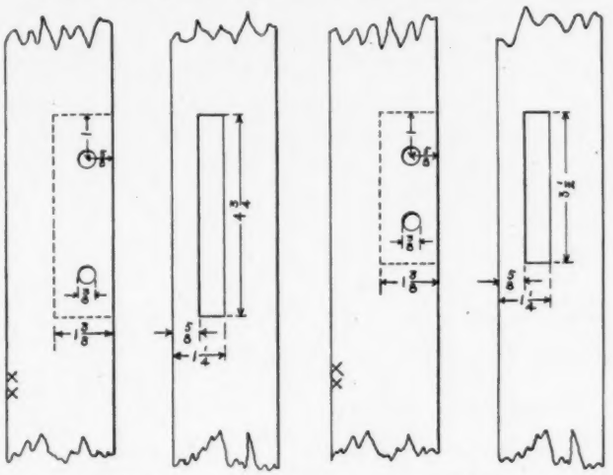


FIG. 6. FIG. 7.

leg so that when the XX marks are placed outward with reference to the framework, the best surfaces shall face forward and outward. The same precaution should be taken in marking the faces of the rails.

The upper ends of the posts are beveled about three-sixteenths of an inch on every side, at an angle of forty-five degrees.

To lay off the mortises, place the legs side by side on the bench with the back sides of the forward legs but the forward sides of the back legs up. Even the top ends by using the try square along one of the sides and across the ends.

Measure from the top on one of the legs two and

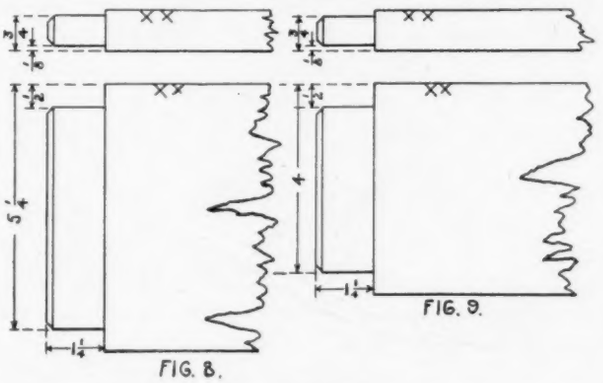


FIG. 8. FIG. 9.

one-half inches and square a light, sharp pencil line across the four legs at this point. Again, measure three and one-half inches from this line and square a line across. Measure from the line last drawn thirteen and one-half inches and mark, then four and three-fourths inches. There should remain between the line last drawn and the end of the leg seven and three-quarter inches. These marks should be on the sides of the legs which have no XX marks on them, providing you intend to have the XX marks outward when in place.

With the try square continue these lines on every leg on the sides which are not marked XX. Do not, however, mark the top two marks of the forward legs as no rail goes across and the marks would but add confusion.

Set the gauge to five-eighths of an inch, and placing the gauge against the XX sides (Figs. 6 and 7), gauge lines between the top two lines and also the bottom two lines, or on the three and one-half and four and three-quarter-inch spaces. Set the gauge to one and one-quarter inches and gauge the same spaces from the same sides. No gauge marks should appear on the XX sides.

There are several ways in which to cut the mortises. Some carpenters use a chisel just the width of the mortise. A cut is made in the middle of the mortise as deep as possible, yet allow the chisel to be worked loose easily. Another cut is then made near this one, keeping the bevel of the chisel next the first cut. This is continued to the end of the mortise, the wood being pried out as the cutting proceeds. The

chisel is reversed and the cutting is done from the middle to the other end of the mortise.

The chisel should be sunk the full depth of the mortise as soon as possible, in this case one and three-eighths inches. In making the last cut, or the cuts near the end of the mortise, care should be taken not to mar the sharp edges of the mortise by prying on them. The worker should stand so as to look along the mortise; only in this way can he sight the chisel plumb and get the sides perpendicular.

Another way to cut the mortise, and a better one where the mortises are of considerable size, is to bore a series of holes as close together as possible using a bit of a diameter almost equal to the width of the mortise. They should be bored the full depth of the mortise. This can be told by fastening a stop to the bit, or by measuring the distance from the wood to the brace, subtracting the required depth from the distance measured from the lip, or cutting edge, of the bit to the brace will give the distance wanted.

The sides, then the ends are cut with the chisel.

care being taken to stand so as to sight the chisel plumb.

The rails should be got from seven-eighths-inch stock. Square up two pieces five and three-quarter inches wide by forty-four and one-half inches long; two pieces five and three-quarter inches wide by twenty-three and one-half inches long; one piece four and one-half inches wide by forty-four and one-half inches long; two pieces four and one-half inches wide by twenty-three and one-half inches long. On the ends of these rails the tenons (Figs. 8 and 9) are to be cut.

To lay off the tenons on the five and three-quarter-inch rails (Fig. 8) measure back from one end one and one-quarter inches, and square a knife line entirely around the rail. Be sure to keep the beam of the try square against the joint-edge and working face only. In doing this set the gauge to one-eighth of an inch, and keeping the gauge block against the working face, gauge on the two edges as far back as the knife lines, also on the end of the rail. Next, set the gauge to three-quarters of an inch and gauge from the same face and on the same edges and end. Set the gauge to one-half of an inch and gauge from the joint-edge on the sides of the rail and on the ends. Now set the gauge to five and one-quarter inches and gauge from the same edge and on the same sides and end as were just used. This lays out a tenon five-eighths of an inch thick by four and three-quarter inches wide, by one and one-quarter inches long.

The tenons or the rails whose width is four and one-half inches (Fig. 9) are similarly laid out, the gauge being set at four inches, however, in marking the width of the tenon instead of five and one-fourth inches.

Measure from the shoulder of the tenon laid out forty-two inches to locate the shoulder of the tenon on the other end of the long pieces, and twenty-one inches on the short pieces. Lay off the tenons as was done on the first end, working from the shoulders instead of the end of the rail. Place the rail upright in the vise, and with the back saw rip carefully to the gauge marks. Next cross-cut to the knife lines. On account of the small amount of stock to be taken off of the broad surface, a chisel will answer better than the saw. With the chisel bevel the end of the tenon about one-eighth of an inch to insure its starting into the mortise easily.

It will be necessary to fit every tenon into its mortise, and, to avoid confusion, every tenon should be given a number and the corresponding number placed on the mortise. Set the legs in position relative to one another and lay the rails in their corresponding places when numbering. The rails should have the XX marks up and out.

Sandpaper, after having planed and scraped, the legs and rails. Then put together one end of the settle. Glue the tenon with warm glue, if it can be got, just before inserting it in the mortise. Cabinet maker's clamps should be used to draw the framework together, blocks of wood being placed between the clamps and the settle to more evenly distribute the pressure. See that the shoulders of the tenons fit up on all sides and that the rail is square, or makes a right angle with the leg. Put the other end of the settle together in like manner.

After allowing the glue time to set, put the long rails in place. With a stick measure one of the diagonals of the frame, the distance from one of the front legs to the back leg on the other end of the settle; then measure the other diagonal and move the frame until the two diagonals are equal. This squares up the frame.

Unless you have good joints and good glue, it will be advisable to pin the tenons by boring two three-eighths-inch holes each one inch from a line squared around from the end of the mortise and five-eighths of an inch back from the surface which contains the mortise. Bore to a depth sufficient to pass well through the tenon (Figs. 6 and 7). Insert three-eighths-inch dowel pins in these holes and cut them off flush with the surface. This ought to be done before the clamps are removed.

Fit a piece seven-eighths of an inch thick by four and three-quarter inches wide inside of the front rail, flush with the bottom of it. Fasten it to the rail with screws. In like manner fit and fasten one to the rear lower rail. To these pieces fasten with nails eleven slats two inches wide by one-half an inch thick. (Fig. 5.)

Place castors under every leg.

This design was purposely made simple in its construction, therefore severe. It can easily be modified by those who are good workers. See the half-tone of a settle in Mr. Karpen's article in the April number of the AMERICAN CARPENTER AND BUILDER for suggestions. A few pillows for the back will make of this settle a very comfortable piece of furniture.

New Method of Stairbuilding

The stair builder who, of all woodworkers, has one of the most difficult tasks, is threatened by the invention of a north side man who believes he has found a way of constructing stairways much more cheaply. The plan includes an inclined plane with grooves, in which are inserted triangular frames with level surface on which the foot is to rest. The foot rest is strong, but light and kept from slipping by the weight of the person. In the progress up or down stairs, the foot rest may be made to slide, and the size of the step may be anything from an inch to the extreme of leg-stretching. Experiments are now being made with the device and great claims in the matter of convenience and comfort for the aged and infirm are made for it.

RESIDENCES

Three Desirable Houses

PERSPECTIVE AND FLOOR PLANS GIVEN—MATERIALS USED IN CONSTRUCTION—DESIRABLE FEATURES IN THE DIFFERENT PLANS—COMPLETE ESTIMATE GIVEN

WE ARE this month publishing three plans of houses from different parts of the country. They vary greatly in style of architecture and in cost.

The plans for the house illustrated on page 562 were prepared by G. W. Ashby and have met with great favor. The entire walls are plastered on the outside. The finishing coat of cement applied was mixed with pure white sand which gives it a pure white effect. The two porch columns were treated in the same way. The timber work was stained brown, while the roof was covered with stained moss green shingles. The foundation and chimneys were built of cherry red pressed brick. The entire color effect being very harmonious and attractive. Another fine feature is the terrace platform, which doubles the area of the porch.

There is a cellar under the entire house which can be used for heating apparatus and store room. The first floor has three large rooms: the dining room, living room and kitchen. The dining and living rooms are finished in oak and are connected by sliding doors, which can be opened when desired, making one large room. The stairway is also constructed of oak, while the rest of the house is finished with yellow pine. A good feature about the house is the rear vestibule to the kitchen which contains the ice box. This is a great convenience, as it does away with the climbing of the cellar stairs to both the lady of the house and the ice man. The second floor has three large bedrooms and a bathroom, and all of the rooms, with one exception, have two or more windows, which is a very desirable feature, as no house can have too much sunlight. The style of architecture of this house is called Old English, which is being used very extensively, as it gives the house a distinguishing feature.

A Colonial House

The illustration of a colonial residence shown on page 563, was recently erected for Dr. Finney at Lincoln, Neb., from plans prepared by and built under the supervision of A. W. Woods.

This house is substantially built throughout, two by six studding were used for all of the exterior walls, sheathed with shiplap and covered with two thicknesses of heavy rosin paper and sided with narrow lap siding. All of the exterior walls are back plastered and all openings between joists and studdings at each floor are cut off by fitting in seven-eighths-inch boards, thereby making two complete dead air spaces for each story. The foundation walls are of stone and concrete range blocks. The basement extends under the full size of the house and is divided into laundry, cellar, fuel and furnace rooms, and all have concrete floors.

The heating is furnished by means of a warm air furnace. Each room having an equal area of returning pipes to cold air chambers in the basement, which are connected with the furnace by means of a tunnel. The rooms are large and well lighted. The dining room is fifteen by twenty-two feet in size and finished with ceiling beams. The large fireplace at the end of the main hall is of plain red pressed brick with ornamental trimmings and extends to the ceiling.

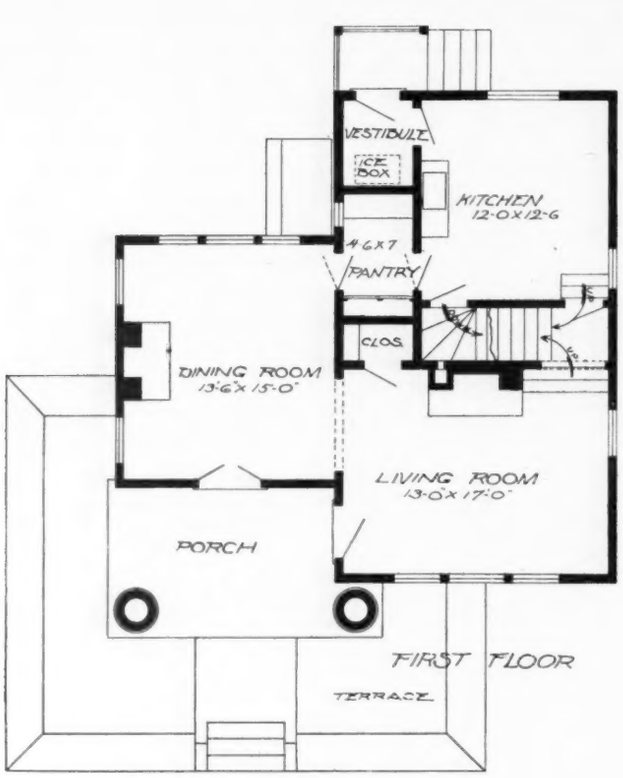
All of the rooms on the first floor, excepting the kitchen and pantry, are finished in waxed antique oak and with red oak floors. All other rooms, including the attic are finished in select yellow pine. All floors are doubled. The first being of shiplap and lined with felt paper. The plumbing and fixtures are first-class. The lighting is by electricity and gas.

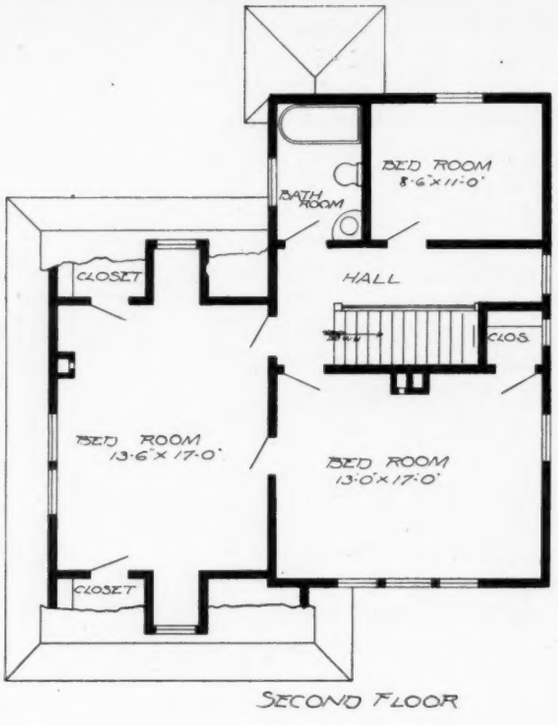
The glass on the first and second floors is of best polished plate, while the art glass is plain bevel plate set in copper.

The house is painted white and with its twelve-foot wide porch across the front and the dark slate roof gives a very pleasing effect and makes an ideal home. The house cost complete with concrete walks $8,750.

A Five-Room Cottage

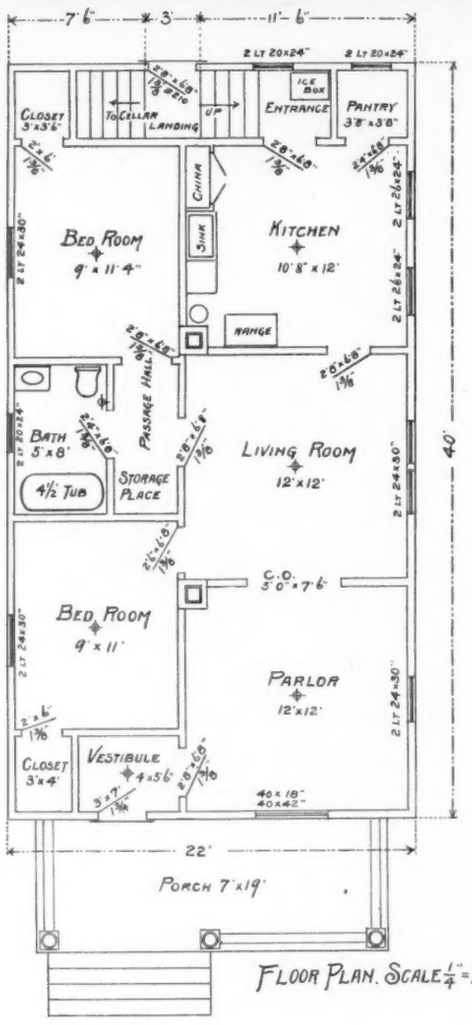
The plans for the five-room cottage illustrated on page 564, were prepared by I. P. Hicks. The working plans are here shown for the floor arrangements, basement, front and side elevations together with a perspective view showing how it will appear after the house is built. The floor plans show it to be well arranged and with the modern conveniences makes a comfortable home for a small family. The outside dimensions are twenty-two by forty feet, and being without projecting angles simplifies the construction of the building yet giving to every part ample light.


VESTIBULE
ICE BOX
KITCHEN
12·0×12·6
4·6×7
PANTRY
CLOS.
DINING ROOM
13·6×15·0
LIVING ROOM
13·0×17·0
PORCH
TERRACE
FIRST FLOOR

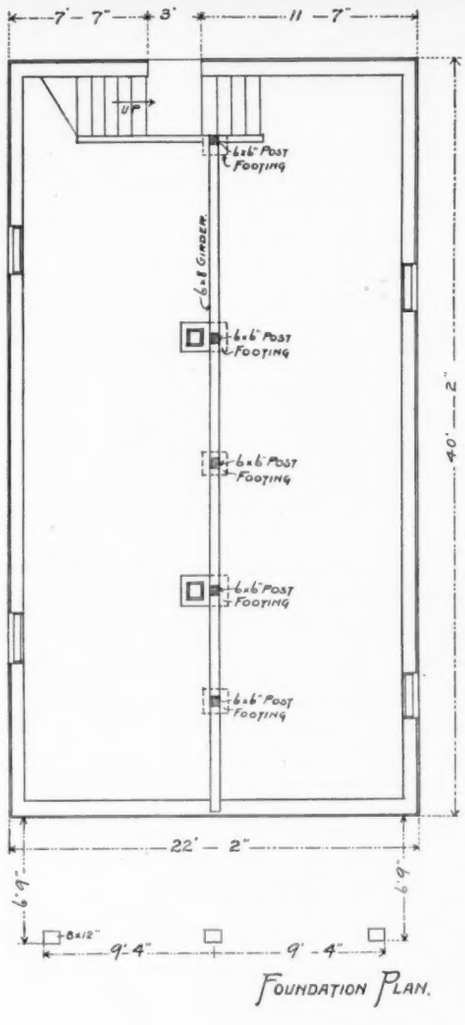

BED ROOM
8·6×11·0
BATH ROOM
CLOSET
HALL
CLOS.
BED ROOM
13·6×17·0
BED ROOM
13·0×17·0
CLOSET
SECOND FLOOR

WALK
CISTERN
LOW ROOF
LATTICE PORCH
HIGH WINDOW
TABLE
ICE BOX
SINK
TABLE
PANTRY
KITCHEN
CUPBOARD
CUPBOARD
DINING ROOM
BACK HALL
CLOSET
CLOSET
LAVATORY
HALL
38'0"
STEP
DRIVE WAY
SITTING ROOM
BOOK CASE
VESTIBULE
SEAT
PARLOR
40'0"
PORCH
WALK
FIRST FLOOR

CLOSET
BATH ROOM
BED ROOM
BED ROOM
CLOSET
HALL
SEWING ROOM
CLOSET
CLOSET
CLOSET
PLATFORM
SEAT
BED ROOM
STUDY HALL
BED ROOM
VERANDA
SECOND FLOOR



FLOOR PLAN. SCALE $\frac{1}{4}$" = 1 FT



FOUNDATION PLAN.

The chimneys are so arranged that a stove may be set up in any room desired, or if a furnace is set in the center of the basement, all of the rooms can be reached with a short run of pipe, which is very essential for the saving of heat and economy in fuel bills. The large attic space can be utilized for light storage purposes, which oftentimes will be found quite handy, though for that purpose the ceiling joists should be heavier than shown. The wide porch across the front tends to give the house a pleasing effect as well as comfort for the occupants.

The following is a complete estimate of the cost of the house as prepared by Mr. Hicks.

Excavating and Masonry

132 yards excavating at 25c per yd	$ 33.00
14,800 bricks laid in foundation wall at $11.00 per M ft.	162.80
60 lineal feet 8″x8″ flues at 90c per lineal ft.	54.00
Total excavating and masonry	$249.80

Lumber Bill

	Feet.
2 6″x6″x22′ sills	132
4 6″x6″x16′ sills	192
2 6″x6″x18′ sills and posts	108
2 6″x8″x18′ girders	144
12 2″x2″x16′ furring	66
16 1″x6″x16′ braces	128
32 2″x8″x22′ floor joists	928
8 2″x6″x20′ porch joists	160
230 2″x4″x22′ studding	1,495
20 2″x4″x12′ gable studding	160
32 2″x4″x16′ plates	352
12 2″x4″x10′ porch ceiling	78
7 2″x4″x18′ porch rafters	84
42 2″x4″x16′ rafters	462
32 2″x4″x14′ ceiling joists	288
32 2″x4″x10′ ceiling joists	208
Total feet of lumber	4,985

4,985 ft. dimension lumber at $21.00 per M	$104.69
3,000 ft. No. 2 Yellow Pine sheathing 1″x10″x16′ and 18′ at $19.00 per M	57.00
1,500 ft. No. 2 Yellow Pine sheathing 1″x8″x16′ and 18′ roof at $19.00 per M	28.50
12,500 Star A star cedar shingles at $3.00 per M	17.50
1,500 ft. ½″x6″ clear cedar siding at $28.00 per M	42.00
4 rolls of red rosin building paper at $1.00 per roll.	4.00
1,100 ft. of 1″x4″x12′ and 16′ star Yellow Pine flooring at $27.00 per M	29.70
148 ft. 1″x4″x14′ fir flooring, porch at $40.00 per M.	5.92
400 ft. 1″x12″x16′ fir finish at $43.00 per M	17.20
200 ft. 1″x10″x16′ fir finish at $43.00 per M	8.60
150 ft. 1″x8″x16′ fir finish at $40.00 per M	6.00
40 ft. 1⅛″x8″x16′ fir finish at $45.00 per M	1.80
60 ft. 1⅛″x12″x16′ fir finish at $45.00 per M	2.70
160 ft. of ⅝″x4″x14′ Yellow Pine ceiling at $27.00 per M	4.32
Total lumber bill	$329.93

Mill Work

4 cellar window frames at $1.25	$ 5.00
1 front door frame 3′ 0″x7′ 0″	2.25
1 rear door frame 2′ 8″x6′ 8″	2.00
1 window frame 40″x18″ 40″x42″	3.00
1 mullion frame 24″x30″, 2 lts.	4.00
3 window frames 24″x30″, 2 lts. at $2.00	6.00
2 window frames 26″x24″, 2 lts. at $2.00	4.00
3 window frames 20″x24″, 2 lts. at $1.75	5.25
1 window frame 20″x18″, 2 lts.	1.50
3 cellar sash 10″x14″, 3 lts. at 90c.	2.70
1 window 40″x18″ 40″x42″ D. S.	8.00
5 windows 24″x30″, 2 lts. D. S. at $2.50	12.50
3 windows 20″x24″, 2 lts. S. S. at $1.35	4.05
2 windows 26″x24″, 2 lts. S. S. at $1.90	3.80
1 window 20″x19″, 2 lts. S. S.	1.10
1 front door 3′x7′x1¾″	7.00
1 rear door 2′ 8″x6′ 8″x1⅜″	5.00
5 doors 2′ 8″x6′ 8″x1⅜″ at $2.70	13.50
2 doors 2′ 4″x6′ 8″x1⅜″ at $2.35	4.70
1 door 2′ 6″x6′ 8″x1⅜″	2.50
2 doors 2′x6′x1⅜″ at $2.20	4.40
2 china closet doors 1′ 4″x3′ 8″x1⅛″ glazed one light at $2.00	4.00
11 set door jambs at 60c	6.60
200 ft. 3½″ crown molding at 2c	4.00
200 ft. 2″ bed molding at 1¼c	2.50
124 ft. 1¾″ drip cap at 2c	2.48
300 ft. 7½″ base at 3½c	10.50
60 ft. plain base, closets at 3c	1.80
500 ft. ⅞″ quarter round at 60c per H	3.00
100 ft. cove molding at 60c per H	60
168 ft. ½″x1⅛″x14′ window stops at 50c per H	84
216 ft. ½″x2″x14′ door stops at $1.00 per H	2.16
416 ft. ⅞″x4½″x12′ casing at $3.00 per H	12.48
160 ft. ⅞″x4½″x12′ head casing at $3.00 per H	4.80
160 ft. 1⅜″x2¾″x12′ cap molding at $2.00	3.20
160 ft. ½″x1⅛″x12′ fillet molding at 50c	80
60 ft. 1⅛″x3½″x12′ window stool at $2.00	1.20
60 ft. ⅞″x4½″x12′ apron at $2.00	1.20
3 porch columns 7½″x7½″x8′ at $3.50	10.50
20 lineal ft. porch rail, bottom at 5c per lineal ft.	1.00
20 lineal ft. porch rail, top at 5c per lineal ft.	1.00
60 porch balusters 1¾″x1¾″x24″ at 4c.	2.40
40 square ft. porch lattice at 10c square ft.	4.00
40 ft. chair rail ⅞″x4½″ at 3c per ft.	1.20
140 ft. picture molding at 1½c	2.10
44 plinth blocks at 10c	4.40
4 thresholds at 20c	.80
56 ft. ⅞″x4″x14′ closet casing at 2c per ft.	1.12
Total mill work	$159.80

Carpenter Work

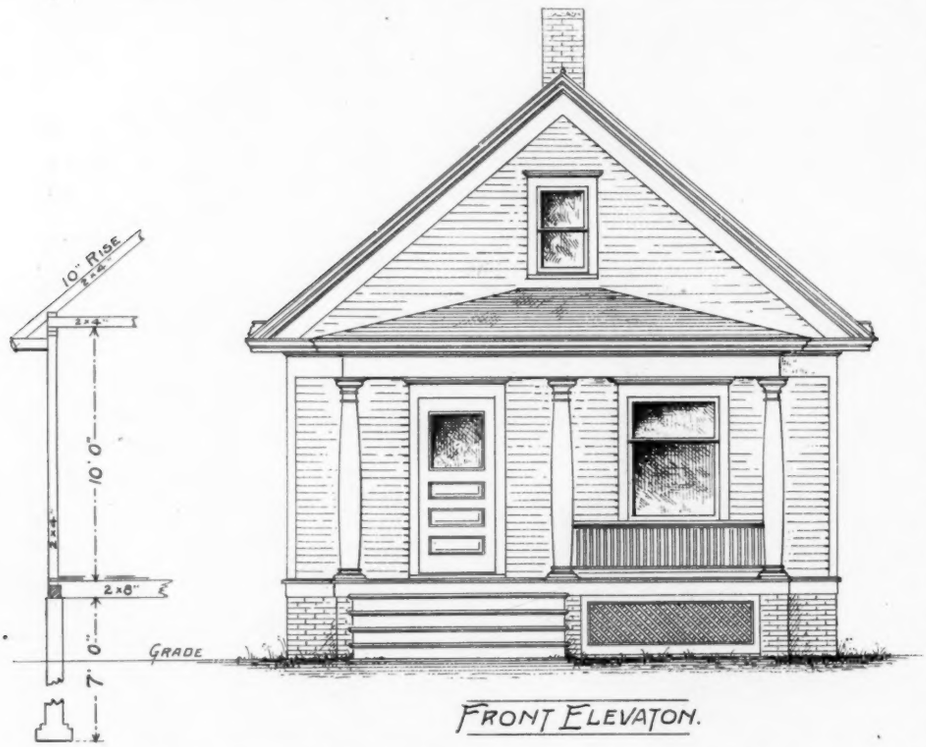
4,989 ft. framing lumber at $10.00 per M	$ 49.89
4,500 ft. sheathing at $8.00	36.00
12,500 shingles at $1.50	18.75
1,100 ft. flooring at $13.00	14.30
1,500 ft. siding at $15.00	22.50
19 lineal ft. of porch at $1.25 per lineal ft.	23.75
160 lineal ft. main cornice at 15c per lineal ft.	24.00
Cellar stairs	3.00
Outside steps	3.00
One-third cost of mill work for finishing	53.27
Total carpenter work	$248.46

Recapitulation

Excavating and masonry	$ 249.80
Lumber bill	329.93
Mill work	159.80
Carpenter work	248.46
Hardware	36.00
Tin work	15.00
Plastering 510 yards at 27c	137.70
Plumbing	210.00

Painting	55.00
Incidentals 5 per cent	71.97
Total estimate	$1,513.66

In the foregoing estimate the carpenter work is figured on a basis of 35c per hour, and any contractor who employs men that will do a reasonable day's work ought to be able to complete the house for the price given without falling behind in either labor or material.



FRONT ELEVATON.

After the bills of material are made out it is shown how easily the carpenter work can be estimated by the thousand feet of material, etc. For example the 4,989 feet of framing lumber at $10.00 per thousand. Framing lumber can be put into a building for $10.00 per thousand, sheathing at $8.00, common flooring at $13.00, siding at $15.00, shingles at $1.50 per thousand, and so on. Cornices and porch work by the lineal foot according to the design, varying the price to suit plain or elaborate designs.

The finishing can be estimated at one-third the cost of the mill work. This is a fair way to estimate the cost of placing the mill work and finishing it in the building. If the mill work is part oak or other hard wood finish, take 36 per cent of the cost for the labor. If all oak finish, then allow 40 per cent for the labor.

The labor figured for the design here given is for yellow pine finish throughout.

Best Journal of Its Kind

I receive the first of each month the best journal of its kind published, and that is the AMERICAN CARPENTER AND BUILDER.. I think it is worth much more to the carpenter than the editor described it.—W. E. Nichols, Gillett, Ark.

Points on Estimating

Every ambitious carpenter looks forward to the time when he either occupies a position of responsibility or is in the contracting business himself, and we think that a few points on the mysterious process of estimating would be of interest to our readers. We use the word "mysterious" advisedly, for very few persons, seemingly, understand the method of estimating correctly, as doubtless you are aware if you have noticed the difference in the prices asked for the same work by various contractors, some of the amounts being unreasonably large while others were ridiculously low, thus showing that no regular method of estimating had been adopted.

Bids made with much care and with the allowance of only the smallest margin of profit are beaten by others, who offer to do the work for less than half. Evidently there is something wrong, either there is gross ignorance or an intention to evade some of the conditions of the specifications—the one quality brings financial disaster, the other a reputation for sharp dealing; and neither brings success.

The first duty of a contractor is to look out for his own interests, and this can only be done—to last—by taking his contracts at a good honest price and dealing squarely with the work in hand. To take a job at a price that will hardly cover expenses is inviting ruin.

I take it that a builder does not work for love; therefore he should never take a job for less than the sum he has decided upon as being the amount he should receive for the work intended. It is far better to lock up your shop and let your plant be idle than to work at a loss or to take work below its value and "stick" your customer.—*The Practical Carpenter.*

Very few of us are as good men as we think we are, but practically all of us are better than some other people think we are, and, besides for a man to attain any degree of greatness he must begin by thinking he has some of this element in him.

Dull tools are signs of neglect and not of excessive work, because any thinking man knows that the way to make time and turn off lots of work is to keep his tools in good condition.

FARM BUILDINGS

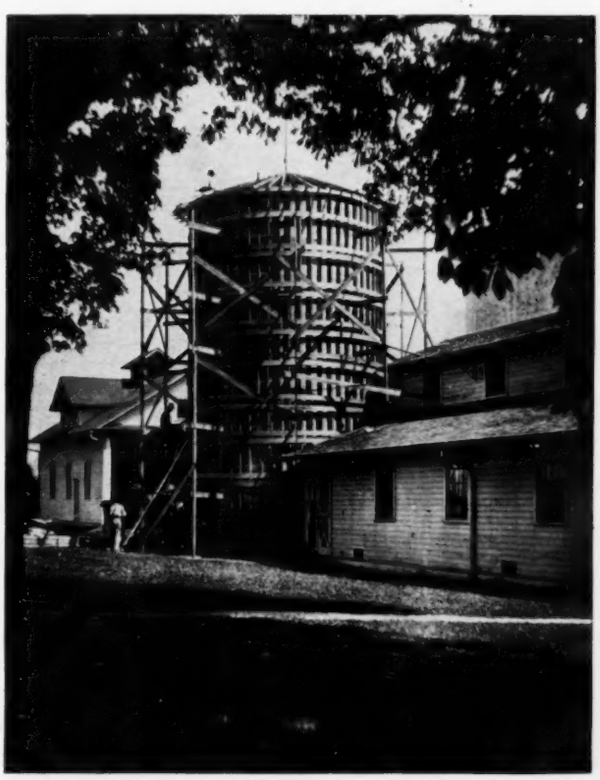
HENRY H. NIEMANN

Two Practical Silos

FULL DETAILED DRAWING SHOWING THE CONSTRUCTION OF A SILO—THINGS TO GUARD AGAINST IN BUILDING THEM—VALUE OF SAME ON THE FARM

THIS month we illustrate the construction of the silos of the Geo. B. Robbins farm, which are built of concrete, wood and brick so as to unite strength and durability to an artistic outline.

The accompanying illustrations show the exterior



during the course of construction and after completion.

The foundation walls are constructed out of concrete two feet in thickness and running down below frost line, where they rest on a ten-inch by thirty-two-inch concrete footing course to avoid settling. This concrete work is composed of one part Portland cement, three parts sand and four parts crushed stone, and is reinforced with a five-eighths-inch iron hoop to prevent the walls from spreading. There are anchor bolts bedded in the concrete with which the wooden sill is bolted solid on to the concrete foundation.

The area inside the foundation is excavated down to the footing course in order to increase the capacity, and has a concrete floor slightly pitched to the center.

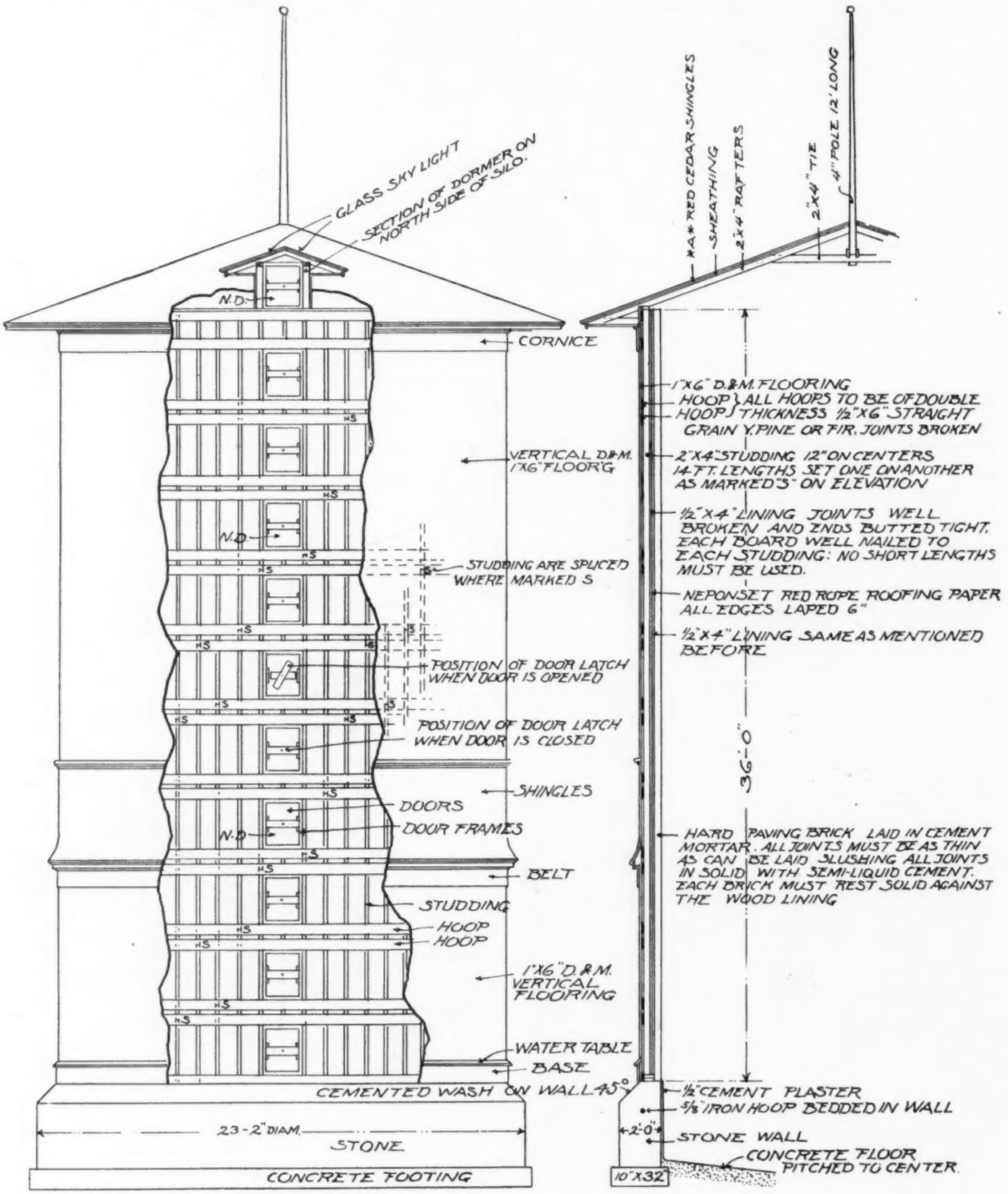
Frost may not do great damage to the silage as far as its food qualities are concerned, but if frozen into a solid mass it is very difficult to handle and should therefore be to some extent protected against heavy frost. Hence wood construction with dead air spaces between the studding and heavy building paper between the sheathing has been selected as the most practical construction.

Silage is very heavy and creates a great pressure against the walls, similar to water in a tank, and to

prevent this pressure from bulging out the walls the silo has been built in the shape of a cylinder. The sheathing boards on the inside and outside surface of

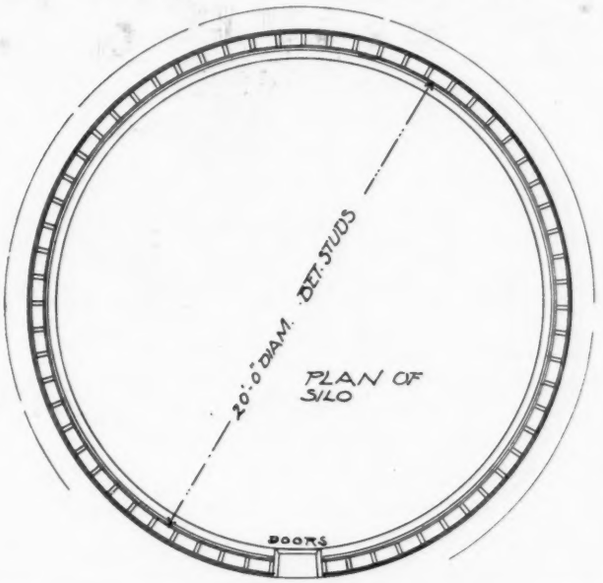
the studding have been re-sawed to one-half-inch thickness out of one-and-one-eighth-inch boards so that it can without difficulty be bent around the wall and securely nailed in place, thus breaking the joints as to form a continuous series of hoops.

To properly preserve the silage it is necessary to exclude the air, hence the walls must be perfectly airtight. This is frequently accomplished by lathing and plastering the interior surface of the silo with cement mortar, which makes a very hard and airtight surface. However experience has proven that the acids in the silage are very detrimental to the cement causing it to chalk and crumble away so that it becomes necessary to re-coat the surface with cement


GLASS SKY LIGHT
SECTION OF DORMER ON NORTH SIDE OF SILO.
N.D.
CORNICE
VERTICAL D.&M. 1"X6" FLOOR'G
STUDDING ARE SPLICED WHERE MARKED S
POSITION OF DOOR LATCH WHEN DOOR IS OPENED
POSITION OF DOOR LATCH WHEN DOOR IS CLOSED
SHINGLES
DOORS
DOOR FRAMES
BELT
STUDDING
HOOP
HOOP
1"X6" D.&M. VERTICAL FLOORING
WATER TABLE
BASE
CEMENTED WASH ON WALL 45°
23-2" DIAM. STONE
CONCRETE FOOTING
10"X32"
36'-0"
2'-0"
#A# RED CEDAR SHINGLES
SHEATHING
2"X4" RAFTERS
2"X4" TIE
4" POLE 12' LONG
1"X6" D.&M. FLOORING
HOOP } ALL HOOPS TO BE OF DOUBLE
HOOP } THICKNESS 1/2"X6" STRAIGHT GRAIN Y. PINE OR FIR. JOINTS BROKEN
2"X4" STUDDING 12" ON CENTERS 14 FT. LENGTHS SET ONE ON ANOTHER AS MARKED "S" ON ELEVATION
1/2"X4" LINING JOINTS WELL BROKEN AND ENDS BUTTED TIGHT, EACH BOARD WELL NAILED TO EACH STUDDING: NO SHORT LENGTHS MUST BE USED.
NEPONSET RED ROPE ROOFING PAPER ALL EDGES LAPED 6"
1/2"X4" LINING SAME AS MENTIONED BEFORE
HARD PAVING BRICK LAID IN CEMENT MORTAR. ALL JOINTS MUST BE AS THIN AS CAN BE LAID SLUSHING ALL JOINTS IN SOLID WITH SEMI-LIQUID CEMENT. EACH BRICK MUST REST SOLID AGAINST THE WOOD LINING
1/2" CEMENT PLASTER
5/8" IRON HOOP BEDDED IN WALL
STONE WALL
CONCRETE FLOOR PITCHED TO CENTER

ELEVATION OF SILO SHOWING DOORS ON EAST SIDE FACING INTERIOR OF COW BARN) ALSO CONSTRUCT DOORS ON NORTH SIDE AS MARKED "N.D."

every few years. For this reason, in place of cement plastering, the inside surface has been veneered with vitreous paving brick, which do not absorb moisture



and are proof against the action of acid. These brick are laid tight against the sheathing surface so the pressure can not change their position and laid in a thin bed of cement mortar not exposing any more mortar to the surface than is necessary to properly bond the brick together.

The exterior surface is composed of dressed and matched narrow flooring nailed vertically to the outer hoops. About ten feet above the ground there is a shingled belt for exterior effect in harmony with the adjacent cow barn. The roof is of shingles and has a wide projecting cornice of the same design as the other buildings of this farm.

His Trade Pin

A verdant youth who had just completed his apprenticeship as a carpenter, dropped into a jewelry store and, after looking at some fraternity pins, asked: "How much is this one with square and compasses on?" pointing to a Masonic pin. "Five dollars," said the dealer. "You haven't got one with a hand saw on, have you? I'm just out as a carpenter and jiner, and I'd like to have something to wear so people would know what I am doing. I'll take it, though I'd like to have one with a hand saw, but I guess this one's plain enough. The compass is to mark out our work, and the square is to measure it out, and every gol durn fool knows that G stands for gimlet."

Use of Stencils in Decoration

VARIOUS DESIGNS THAT CAN BE USED VERY APPROPRIATELY—DESCRIBING HOW THEY ARE TO BE USED—EFFECTS THAT CAN BE PRODUCED

By Sidney Phillips

TO MANY persons the wood stencil conveys only the idea of the brass letter stencils used for marking boxes and the like. These, however, are not the stencils used by decorators, although they are similar in their principle, in that the design to be repeated is cut out and the color is brushed through the cut out pattern upon the surface to be decorated. Stencils are employed where the same ornament is to be repeated a number of times, avoiding the necessity of redrawing it and filling in the outlines freehand. While stencil decoration is, to a certain extent, mechanical it still admits of a great deal of individual expression, not only in the original design of the ornament but also in its coloring and in the actual application of the colors. The stencils used by the decorator, instead of being cut or punched out from thin sheets of metal, are cut from manilla paper, such as is used by architects for making detail drawings, or from a tough, smooth-grained paper made specially for cutting stencils. The only tools required for stencil cutting are a sharp knife, an oilstone, a sheet of glass or zinc for cutting upon, a metal edged ruler for guiding the knife when cutting straight lines, and perhaps three or four circular punches from a quarter inch to three-quarters of an inch in diameter, although these latter are not absolutely essential, for many men with a steady hand can cut an accurate circle with a knife. After the design is drawn, the paper is given a heavy coat of linseed oil, before cutting it, as a much cleaner cut can be made in well-oiled paper. Kerosene oil is sometimes used and answers the purpose equally well, though it is not so good as the linseed oil. A little practice will teach the operator how to swing the paper round and to use his knife in order to produce the cleanest cut and to follow the sweep of the curves in the design.

Fig. 1

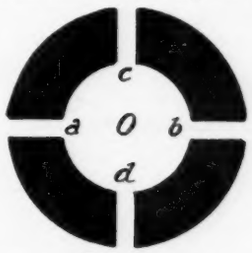


Fig. 2

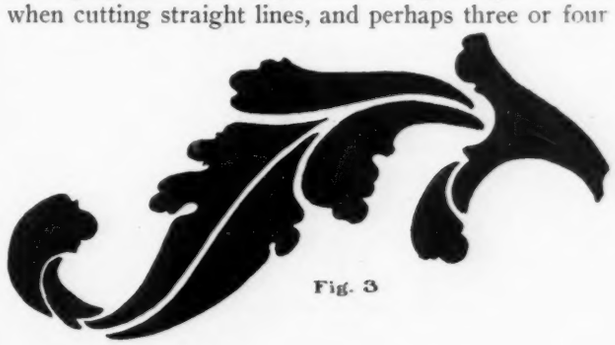


Fig. 3

In designing a stencil, the first thing to be considered is the ties. These are the pieces of paper which cross the pattern to bind the stencil together. For example,

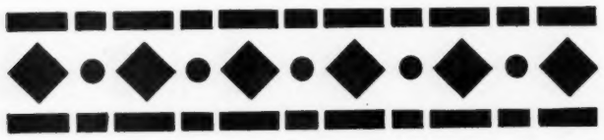


Fig. 4

if we were to attempt to cut a stencil of a circular ring (Fig. 1), we should find that the central portion, O, would drop out, and our stencil would simply be a large disc. To obviate this, we break the pattern with the ties, a, b, c and d (Fig. 2), and the central portion, O, is held in its place. If the perfect ring is required, we must either fill in the ties by hand, after the pattern has been stenciled, or what is easier, we must cut a second stencil, overlapping the first, so that the portions of the design omitted by the first stencil are supplied by the second. By means of these double stencils, as they are called, practically any design can be produced, so that it is possible to give the effect of hand-work without the aid of stencils. But these double stencils are a comparatively modern invention and as yet are but little used, except by the leading decorators

Fig. 5

in the larger cities; most stencil decoration being done by the older form of single stencils, the ties showing in the completed work. But these ties, in the hands of a skillful designer, are not necessarily objectionable, since they can almost always be so arranged as to form a part of the pattern. Let us take, for example, an acanthus leaf (Fig. 3). In this, the ties have been arranged to form the leaf ribs, and the turned over tip of the leaf is also indicated by the tie. Of course, in the black and white reproductions, these stencil designs look crude and harsh in comparison with the effect that they produce when the colorings are soft. It is also possible to blend the colors so that the tip of the leaf may be quite light, while the stem end may be much darker in tone. And by the use of two or more stencils, several colors may be employed.

Excellent decorative effects are often produced by very simple stencil patterns. Here, for example, is a narrow border pattern (Fig. 4), made up entirely of rectangles, squares set diamond fashion, and small circles that may be punched out. Such a stencil is very easy to cut. Several repeats of the pattern, which is very short, should be cut on a single stencil, in order to avoid the necessity for constantly lifting and adjusting the stencil in doing the painting. It will be observed that the figure shows a diamond at each end, and the stencil should be cut in the same way. A chalk line is snapped upon the wall or other surface that is to be stenciled and the pattern laid over it so that the angles of the diamonds exactly intersect this line. The stencil is then firmly held in position with the left hand, and the color is applied with the brush held in the right hand. The stencil is then carefully lifted and moved toward the right, and is placed in such a position that the right hand diamond already stenciled and the left hand diamond in the stencil exactly coincide, all the angles being intersected by the chalk line, as before. This insures the proper continuity of the pattern.

Fig. 6

A border pattern such as we have just been considering can be used for a variety of purposes. It may be run just underneath a picture rail, or be used to form a dado cap, or it may be employed as the top or bottom members of a wide frieze design, where more or less elaborate patterns are introduced. It can also be used for paneling, or could be stenciled very effectively on a flat moulding that is used as a divider for panels or for a chair rail. Plain geometrical patterns are always effective as stencils, and any design that can be broken up into small squares or irregular rectangles, such as a mosaic pattern, is peculiarly appropriate, because the ties come in as an integral part of the design.

Stencil patterns need not be confined, however, to formal and set figures. Here, for example, is a nar-

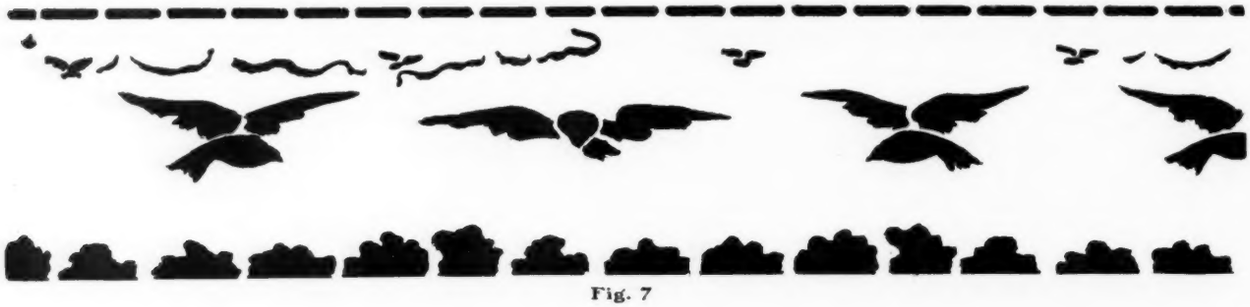


Fig. 7

row border based on a floral motive (Fig. 5), where each flower appears to overlap its next neighbor. A pattern of this kind is enhanced in effectiveness if no attempt is made to keep all the flowers absolutely the same, but so drawing the design that there are little minor variations or irregularities in six or eight of them, being careful, however, to see that these do not prevent proper matching up of the pattern when the stencil is moved.

In wall decorations, single figures are often repeated at regular intervals, or a set figure may be stenciled in the center or the upper portion of a vertical panel. A heraldic device, such as we have here (Fig. 6) is very appropriate in such a position, and a design of this kind makes a very effective stencil. Several colors can be used to great advantage in a pattern of this kind, a separate stencil being cut for each color. For example, the solid quarters of the shield might be bright red; the open portions with the cross bars, gold bronze; the laurel leaves, green, and the ribbons in white, the general ground color being either dark green or dark red.

Almost any style of decorative design can be made into a stencil by the ambitious decorator. For instance, we have here (Fig. 7) a frieze design in which flying birds are stenciled in white or colors against a gray blue ground. The small birds are darker, if those in the foreground are white, or lighter if they are in colors, so as to give the effect of distance. The cloud forms are stenciled in grayish white; the top border in dark blue and the lower border in a dull green, to give the effect of distant tree tops. The effect of the whole would be improved if the background is blended from dark at the bottom to lighter at the top. Of course, other colorings would suggest themselves to accord with the general decorative scheme of the room.

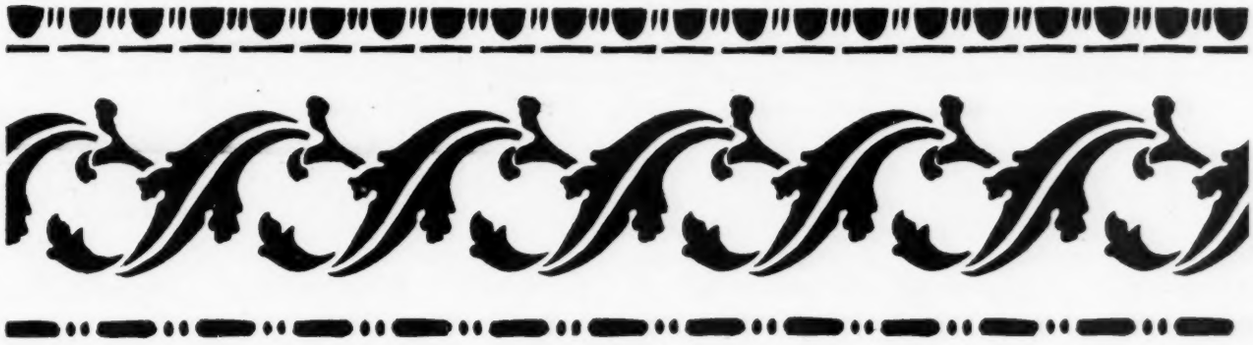


Fig. 8

To return to something more conventional, we illustrate a frieze design (Fig. 8) appropriate for a room in the colonial style, that is made up of a narrow egg and dart pattern at the top, a flowing acanthus scroll for the main design, and a narrow bead ornament for the bottom.

Here is another design that shows how two of the forms already illustrated may be combined, the result being a very effective frieze (Fig. 9).

The subject of stencil designs and the uses of stencils is entirely too broad to be more than merely indicated in a single article. It is sufficient to say here that the value of stenciling as decoration is too little understood by the people at large. By means of stencils, a distinct individuality can be given to the decoration of a house impossible to obtain when the work is limited to wall paper. Plain ingrain wall paper and burlaps are admirable backgrounds for stencil decorations, as well as plain painted walls. In fact, it is almost impossible to set a limit to the decorative use of stencils.

Fig. 9

Correspondence.

A Transom Window Frame

To the Editor: Eldmore, Mich.

Will you please publish a description and detail of a transom window frame, allowing for a three-inch bar with hinged transom light. W. J. WRIGHT.

Answer: The most satisfactory way we have found is to make the frame as for an ordinary two-sash window and make the meeting rail as shown in the section at Fig. 1. This has the appearance of a moulded transom bar. The sash being hung the same as in the ordinary window allows it to be

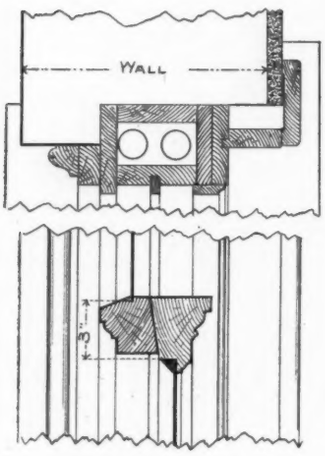


Fig. 1.

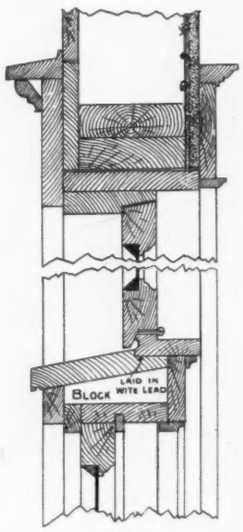


Fig. 2.

lowered at will, leaving no open joints for the wind and rain to get in when closed. It is well nigh impossible to construct a transom when hung with butts and have it weather-proof. In such cases the most satisfactory way we have found is to hang the sash at the bottom similar to that shown in Fig. 2. This makes a fairly tight job and is simple in construction.

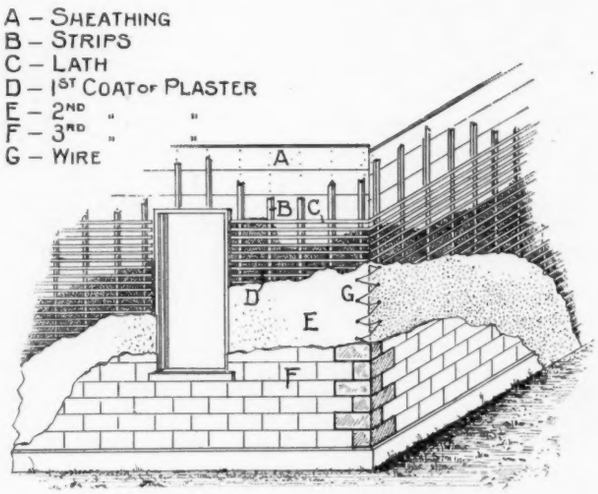
A. W. WOODS.

Remodeling Old Houses

To the Editor: New Dundee, Canada.

I want to ask a favor of you this time, which I trust you will grant. Being in the contracting business, we come across all kinds of work repairing and remodeling old houses; for instance, we get an old, one and a half story frame house, a mere shell so to say, cold and low in the ceiling. What can be done with it? We often make them two stories high, put on additions when necessary and in order to make them warm and yet cheap we cover the new part, if any, with rough boards on a balloon frame. On this we put on one thickness of building paper and then 1 by 2 or 1½ by 2 strips put on vertically 16 inches on centers. These strips are then covered with lath two inches apart and then filled in solid with mortar. This filling coat consists of ordinary lime mortar, such as is used in laying brick. The space back of the lath is filled full of this mortar. Care must be taken, however, that the mortar is not too thin or it will run out. After this coat has sufficiently set, the hair or scratch coat is put on and made rough with a long-tooth instrument, which may be made out of a shingle or piece of sheet iron. After these two coats are thoroughly dried out, which takes from two to three weeks in dry weather, the third or color coat is applied and nicely blocked off. The masons here generally color it a light blue with a raised bead joint. The arches and corners are often made white by plastering with white mortar and then whitewashing it thickly with pure slacked lime before it is dry, as it will then soak right into the mortar. Now instead of white corner blocks and arches I would like to have them a brown sand stone color, but am not sure what to use in order to procure a nice brown color that will not fade. Could you send me a recipe for same? If this letter is of any use to you, you can use it at your free will. It might come handy for some other mechanic if not already known. Care must be taken to keep the strips three inches from the corners and two inches from the window and door frames, so that the mortar is strong enough to resist the jar caused by nailing on the finish. The frames are made the same as for brick work. The lath to stand ½ an inch back from the frames and the mortar to extend over the frames from 1½ to 2 inches. The lath at the corners are nailed together, using 1½-inch nails throughout. Before the last coat is applied the corners are wired with No. 13 or 14 wire to keep the plaster from cracking. The raised bead is made of marble dust and lime. CHAS. H. BECKMAN.

Answer: Inasmuch as Mr. Beckman has given the privilege of publishing his letter we are glad to place it before our readers, since it must be remembered that the AMERICAN CARPENTER AND BUILDER has a circulation of over 25,000 and reaches into every land and clime and places where the modes



of building construction are vastly different from that of another, made necessarily so by the conditions of the climate and surroundings. As it is the chief mission of this paper to

diffuse information in the building line, especially of the homes for the masses, we are glad to publish such letters. What is best to do with old buildings is a hard question to answer, especially so when the object is unseen. But after twenty years' experience in architectural work, we think that about nine times out of ten that it is better to either sell it outright or tear it down and use such of the lumber that is fit in the rebuilding of a new house.

As to the question of what to use to color the mortar, this may be obtained by using brown ochre worked into the mortar to obtain the desired shade, or some of the mortar stains especially prepared to resist the action of the lime might prove more satisfactory, but these are not always easy to be had in the smaller towns. A. W. Woods.

Building an Ice House

To the Editor: Vanburen, Mo.

I wish to build an ice house that will hold about 75 or 80 tons of ice. Will you please tell me how to construct the walls and about the size house it will take. W. L. Richards.

Answer: Most any kind of a house will do for keeping ice, provided it is tight. It should be built with an air space or double walls and lined with water-proof paper between these walls. The floor should have perfect drainage, so that no water can collect under same. The ice blocks should be placed close together as possible, and to do this the pieces should be of uniform size. If sawdust is used for the packing, a space of twelve inches should be allowed on all sides, top and bottom, for such packing. In the absence of sawdust flax straw may be used, but the packing space for same should be doubled.

As to size of the house to hold 80 tons, we find that a cubic foot of ice weighs 58.7 or a fraction over thirty-four cubic feet to the ton. To this we will allow say six feet for lost space in the crevices, which of course will vary according to the size of the pieces used, will make forty cubic feet to the ton. Then a house to contain eighty tons would equal three thousand two hundred cubic feet, or equal to a cube 16 by 20 by 10 feet high. To this allow a space of one foot on all sides for the sawdust packing or double that amount if flax straw is used.

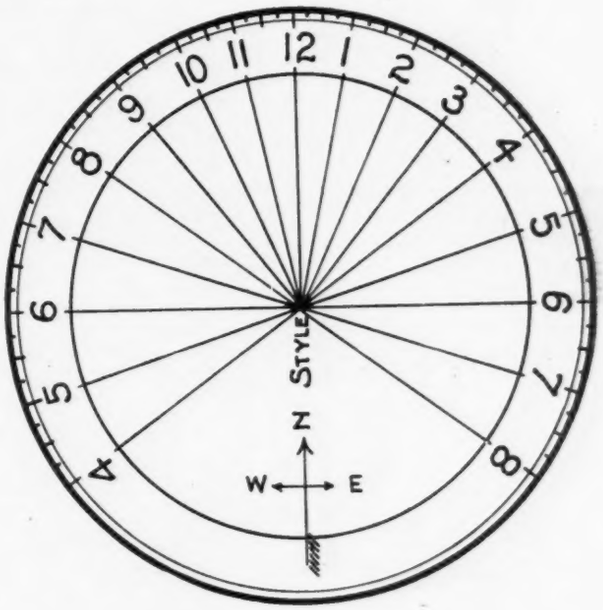
A. W. Woods.

Constructing a Sun-Dial

To the Editor: Denton, Md.

Please give me an illustration and best way to make a sun-dial. S. Frank Cole.

Answer. In attempting to answer this question, we must confess we do not know much about the subject, having never made a sun-dial, but on looking it up we find it to be one of considerable interest. In short, the dialing or construction of a dial is reckoned by twenty-four equal divisions of the earth's circumference taken at the equator and a line passing over these points from pole to pole is called a meridian. Thus, as the sun appears to move around the earth in twenty-four hours, it will pass from one meridian to another in one hour and in course of a day will fall on every particular meridian and all points in that meridian will be noon as it comes in direct contact with the sun. In some of the encyclopedias, we find rules given for the construction of either horizontal, inclined or vertical sun-dials. The numerals on the dial cannot be equally spaced as for the dial of a watch or clock, but it will be similar to that shown in the accompanying illustration. In this it will be seen that the spacing from one side of the twelve corresponds with that of the other. Probably the simplest way to make a sun-dial for lawn purposes would be to lay off the circle in the location where desired and at the center erect the style or gnomon to cast the shadow on the dial. The twelve should be to the north, then with a watch in hand, beginning at noon, mark the hours as the shadows pass over the dial for the remainder of the day and divide up the other side in like manner, placing on the hour number, and it will be



completed. To get all of the hours of the day, the notations should be taken in the latter part of June, as the longest days of the year are at that time. To get the correct sun time, the watch would have to be set accordingly.

A. W. Woods.

Miter Cut on a Moulding

To the Editor: Vale, Oregon.

Will you kindly answer the following through your columns? In making a miter cut on a moulding, for instance to form a right angle, would you designate the cut as a 45 or 90-degree one? Vale Lumber Co.

Answer: This question we have answered directly or indirectly in the course of our regular articles. However we are willing to answer it again, and herewith submit another

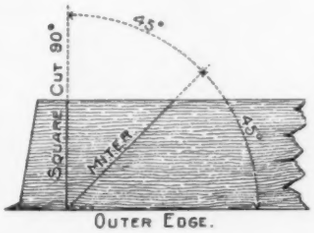


Fig. 1.

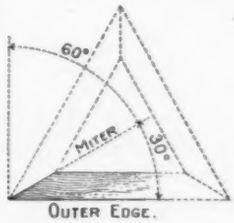


Fig. 2.

form of illustration. A miter is reckoned by the angle in degrees that it stands between the horizontal and perpendicular. Therefore an angle of 90 degrees is not properly a miter. Some claim that it is a butt miter, but we differ with them there. It is simply a square cut and may be properly called a "butt joint," but never a "miter joint." To find the angle on the steel square to obtain the miter we divide 180 (see the April and August numbers) by the number of sides

in the frame. Thus, the quotient for the right-angle corner or four-sided frame is 45 and represents the angle of the miter as shown in Fig. 1. In this case it is at the half-way point between the horizontal and the perpendicular. Therefore the

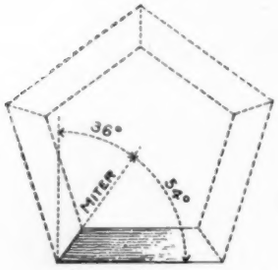


FIG. 3.

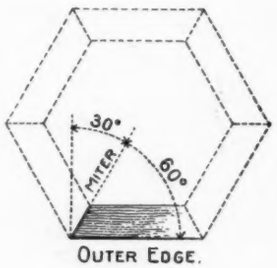


FIG. 4.

degree of the miter and its complement in this case are equal. In Figs. 2, 3 and 4 are shown the angle of the miter for three, five and six-sided frames. In each case it is the complement angle that must be taken on the steel square to obtain the miter. For the figures to use, see Fig. 4 in the May number or Fig. 28 of the August number. ALFRED W. WOODS.

Remedy for Sweating Wall

To the Editor: Clover, S. C.

Please give me some formula for dressing a basement to keep it from sweating. I have built two basements, and in damp weather the walls sweat and drip so that it becomes wet and everything kept inside inclines to mold. Is there anything that I could apply to prevent it? Will another coat of plaster stop it? W. T. BEAMGUARD.

Answer: The following will greatly relieve the sweating of any basement whose wall admits water during rainy seasons, but I have never been able to fully overcome this evil on old brick walls, therefore the first step is to select a dry period and clean the wall thoroughly. Then apply with a brush a composition previously prepared of one pound liquid shellac, twelve parts coal tar and twenty parts Portland cement, add sufficient turpentine to bring same to the consistency of paint and apply on dry wall. Before it has hardened cover same with lime whitewash, and when dry apply a second coat of whitewash. FRED W. HAGLOCH.

Constructing a Cess-pool

To the Editor: Prescott, Wis.

Will you kindly advise me as to the best method of constructing a cess-pool; also for connecting same with bath room? L. H. HARNSBERGER.

Answer: The building of cess-pools should be avoided whenever possible, but in many villages and country homes the proper drainage or sewer connections are not always to be had, and in that case the cesspool is the last resort.

It should be built with as much care as constructing a cistern with walls of brick laid in mortar and well plastered with best quality of cement and provided with cast iron manhole and cover.

The sewer connection should be thoroughly back trapped. Once or twice a year the contents should be dipped out and carted away. We have known cess-pools constructed without cementing the walls for the purpose of allow the liquid matter to seep away in the gravel or loose formation of the soil, thus contaminating the drinking water in nearby wells and possibly in some cases hundreds of feet away.

Modern conveniences is a thing to be cherished in every home, but is it not better to first look well to the possible effect it is going to have on the health of the family and neighbors? A. W. WOODS.

Filing Rip Saws

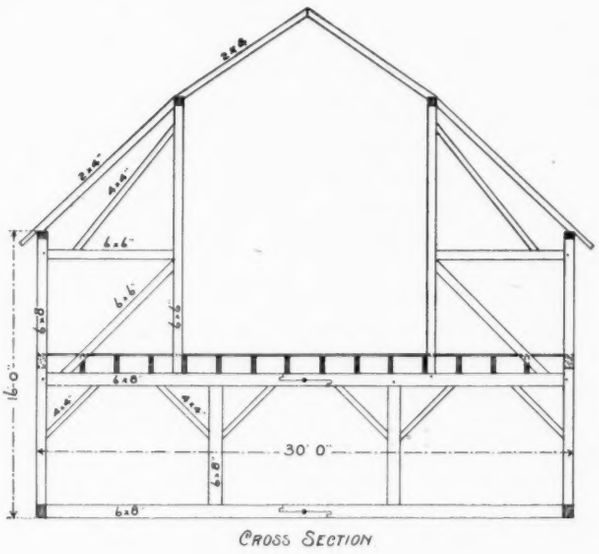
To the Editor: Rochester, N. Y.

In the September number of the AMERICAN CARPENTER AND BUILDER A. C. Robe gives his method of filing a cutoff saw for sawing angles. My practice has been for many years to file rip saws and saws for cutting angles on the plan that he mentions, but I do it quickly by leaning the saw away from me while filing and work from first one side and then the other, holding the file level and at right angles to the vise. This files the front of the tooth square and bevels the back at one operation. H. A. FRANKLIN.

Plan of a Barn

To the Editor: Pittsfield, Ill.

I am mailing to you under separate cover a plan of a country barn, which I have completed. The farmer wants a barn with an abundance of hay room. He also wants as little



CROSS SECTION

timber in the mow as possible. I find a good many carpenters who are puzzled when it comes to framing a barn so as not to have much timber in the way and make a good substantial job. It makes a splendid barn, and one that pleases all who see it. It is the center bent to which I wish to call attention. BEN JOHNSON.

Freezing Test of Concrete

To the Editor: Roxborough, Pa.

Could you tell me what amount of freezing a block will stand which has withstood a test of about eighteen hundred pounds pressure? JAMES KING.

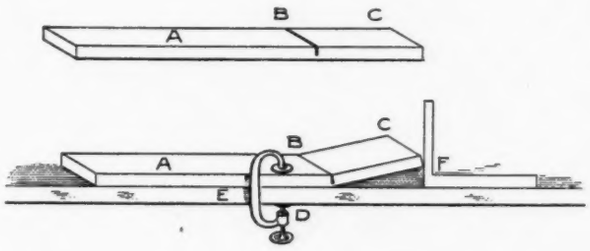
Answer: The crushing strength does not affect the freezing test of concrete, and all high grade Portland cements make frost-proof concrete unless same has set in freezing temperature, and if such has been the instance, then the blocks will crumble upon the frost leaving them. Blocks made of the proportions you mention and properly mixed and seasoned will in six months be superior to granite in crushing, tensile and water absorbing tests, and the less water building material absorbs the more frost proof it is. Barre, Vt., granite will absorb about seven per cent of its weight, and blocks made

of the proportion you speak of will not absorb over four and one-half per cent of water. FRED W. HAGLOCH.

Kerfing a Riser

To the Editor: Jamaica, L. I.

In the August number of the American Carpenter and Builder, page 339, the writer, Mr. Lewis Steinberg, says there is no rule for saw kerfing a riser and can't be done. I will



say a writer for any journal should be careful how he says can't or can't be done. Saw kerfing is the simplest thing the mill man has to deal with, by the method I show with two simple illustrations a piece of wood may be bent to any radius no matter how thick or thin the material may be, or how thick or thin the saw may be.

First—If for a circle to bend three feet in diameter take a piece of stuff about one and one-half inches wide as A and the same thickness of the material to be used. Now take the radius which is eighteen inches and make a kerf that distance from the end as B C to the depth required.

Second—Clamp A down to the bench E close to the kerf and raise the radius end till the cut comes together tight, and take the height with the steel square F from top of bench to underside of piece. This will give the space between each kerf to bend the riser or any thing that has a radius.

JAMES H. STANSBURY.

Flues in Chimneys

To the Editor: Park Lake, Mich.

I am going to build a chimney about twenty-four feet high. It will start on a center wall below the floor. Can I put in it a flue so as to take the cold air off in the winter? Please answer in the next Journal. RICHARD DRURY.

Answer: Yes, but it should be an independent flue. In other words, it can be built alongside of the smoke flue and would, in fact, be a benefit because of the warm air thrown off from same would help to create a draft in the ventilating flue. We would recommend putting in two ventilating registers. One at the floor and one at the ceiling. The upper one to be closed in cold weather and the lower one in warm weather. A. W. WOODS.

A drop of oil once a day is better than a quart once a —well, whenever you happen to think of it.

New Tools for the Carpenter and Builder

INTERESTING DESCRIPTIONS AND ILLUSTRATIONS OF IMPORTANT MACHINES AND MATERIALS THAT ENTER INTO HOUSE CONSTRUCTION IN ITS MANY PHASES AND DETAILS

Five Dollars for the Best Letter

The Bradt Publishing Company of Jackson, Mich., whose advertisement is running in our magazine, offers $5.00 to the person sending them the best letter of endorsement of their books on estimating. They also offer a year's subscription to the AMERICAN CARPENTER AND BUILDER for the three next best letters. This offer will remain open to old and new purchasers of their book on estimating until Jan. 1, 1906.

Stoddard's Steel Square Pocket Folder

Dwight L. Stoddard, the well-known authority on matters pertaining to carpentry, announces the issuance of the second edition of his Steel Square Pocket Folder in an improved form. He states that his object in publishing this folder was to put in the smallest, lightest and most convenient form possible, knowledge that would show the builder at a glance how to frame any kind of roof and give the degree as well as the pitch, and put it at a price in the reach of all. No matter how poor the carpenter, he can easily spare the price of this little work, ten cents. A copy can be secured by addressing Dwight L. Stoddard, 328 West Raymond street, Indianapolis, Ind.

Dumb Waiters at a Moderate Price

The Eaton & Prince dumb waiters were placed on the market to meet the fast increasing demand for a reliable equipment at a moderate price. These dumb waiters are the very highest grade in every particular, being made only of carefully selected materials and furnished with all of the latest improvements.

All sheaves and bearings are a part of the main frame and cannot be placed otherwise than in the correct position, thus insuring no binding or undue wearing of the rope, as is often the case with other machines. Neither can they work loose after being operated a few weeks or months, as some do. It is provided with self-oiling devices, which need but little attention. The automatic brake, which is very powerful and always reliable, enables one to stop the car and hold it at any point without the use of the extra brake rope.

The Eaton & Prince Co., manufacturers, Chicago, will be pleased to furnish catalogues or answer any inquiries.

Key to the Steel Square

This little device is meeting with popular favor among all classes of mechanics whose work in any way pertains to angles. It gives the figures to use on the common steel square to obtain any desired angle. It gives the length cuts and bevels for the common rafter and jacks, also the hip or valley cuts for the square or polygonal cornered buildings. In short, it gives all of the cuts to be had by degrees and per inch rise to the foot from 1 to 24.

It is furnished complete with instruction book and leather case suitable for carrying in the pocket. Just the thing for a Christmas present. See advertisement of A. W. Woods, 198 Fifth Avenue, Chicago. on another page.

Improvement in Wall Construction

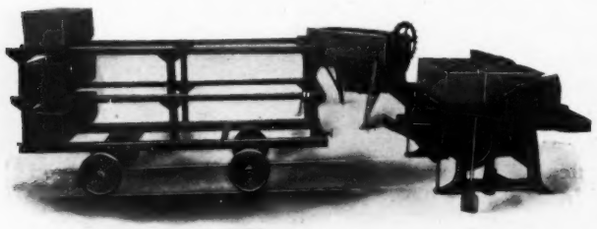
We call the attention of our readers to the advertisement of Nicolas Schietkiewicz of St. Petersburg, Russia. It is seldom that an advertisement from such a distance finds its way into an American paper, but it demonstrates the fact that the world is a small place, after all, and that it does not take long for the excellence of an advertising medium to become known. The readers of the AMERICAN CARPENTER AND BUILDER are to be found in every clime and its army of 25,500 subscribers are vitally interested in all that pertains to the building industry. Our circulation is now greater than that of any building publication in the world and no place is too remote to be hidden from its enlightening influence.

Mr. Schietkiewicz has secured a patent in this country on a concrete stone wall construction. The object of the invention

is to secure a tight and non-conducting joint between the ends of the concrete blocks. In his advertisement he describes in detail what his invention is designed to accomplish. If any of our readers are interested in acquiring the rights of this invention for this country it would be well for them to enter into correspondence with Nicolas Schietkiewicz, Sadowai 26, lg 97, St. Petersburg, Russia.

Machines Sent on Approval

The Cement Machinery Manufacturing Company of Burlington, Iowa, whose advertisement appears on another page of this issue, are getting out a very handsome 80-page catalogue describing fully their line of cement working machin-



ery, and they will be pleased to send a copy of same to any one interested in this line.

This company received the highest award on their Chicago block machines at the St. Louis Fair, and they are now making a larger and greatly improved model, their No. 4 Chicago, which they claim has double the capacity and a much wider range of adjustment than any other machine. They offer to ship this machine on approval to any point in the United States, freight prepaid, and if the machine fails to give satisfaction, they will remove it at their own expense. They also offer to pay transportation of prospective customers who wish to visit their offices in Burlington and investigate their different machines.

This company has a complete line of building block, fence post, sidewalk block, and brick machines, power mixers and tampers, and all accessories for the complete equipment of a cement product plant. They make a specialty of equipping cement block plants in any part of the country.

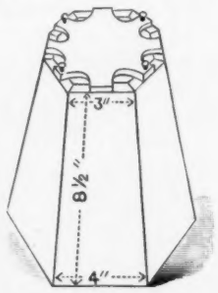
The above very attractive illustration of the mantel in their Burlington office shows the award they received at the St. Louis Fair, and also a number of samples of work turned out by their block and brick machines. The other illustration shows a Chicago plant equipped with their No. 4 machine, set to mold one straight and one corner block at one mold, a three-deck block car, the two upper decks of which are removable, and a mixer built especially for cement block plants.

Concrete Block Paint

It will be of interest to all manufacturers and users of concrete blocks to know that the Garden City Sand Co. is handling the best paint for water proofing concrete blocks. It does not change the color of the blocks but it makes them proof against water acid, fumes or alkali. This solves the problem that has been worrying concrete block manufacturers in the past. It is a paint especially prepared for this work and has proven very successful. It is sold in quantities from one gallon upward by the Garden City Sand Co., 1201 Security Bldg., Chicago, Ill.

Dorn's Revolving Mitre Box

The Braunsdorf-Mueller Co., 1091 East Grand street, Elizabeth, N. J., are manufacturers of Dorn's Revolving Mitre Box. In construction this Mitre Box is radically different from other boxes now on the market. Instead of the table or bed being stationary this one revolves, and the backs swing instead of being rigid. The overhanging saw frame is stationary, while others swing from right to left. It has an unobstructed saw table so moldings may be placed under the saw, directly from the front of the box, instead of shoving it between



two posts endwise. Another and a very important feature is that the backs are set for both ends of the molding once, requiring no readjusting. In other boxes the saw carriage is swung, first to the right for one end of the molding and then to the left for the other end of the molding, the operator working in cramped positions, and is obliged to saw with his left as well as with his right hand. The revolving table admits of the box being used from either side of the bench by two men without being in each other's way. If bench happens to be piled up with stuff, it need not be removed, the box is simply revolved to clear it. It is provided with stops and rests to hold the work against the backs. The backs are released, swung and locked with one hand, and are held at the different angles by one of the best mechanical devices known. A spring clasp holds the saw in a raised position, leaving the hands free to make adjustments, etc. It has an automatic lock, which prevents the saw from slipping out of the guides, although the operator may instantly remove same by tilting the handle end upwards, while withdrawing it. By means of the tilting tables, an entirely new

idea, which are fastened to the backs (see illustration) boards fourteen inches wide may be sawed with a twenty-four by four inch back saw to fit any angle, not only mitering the edge, but also the face of the board, making these attachments indispensable when cutting bases for pedestals and columns, base and other finishings around square and octagon corners. The machine can be knocked down in less than a minute's time, so that it will only take space in chest six by sixteen

inches. The stand has three pointed feet, which prevent the box from sliding on the bench or scaffold, no screws being necessary to hold it. This is a labor saving feature, for no time is required to screw it to the bench in the morning and unscrew it to put in chest in the evening. An outline of an octagon cone shaped base is shown above to give an idea of the scope of work that may be done on this machine. It is accurate and has all the up-to-date improvements.

A Modern Wood Working Machine

This half-tone engraving represents the latest improved extra heavy twelve-inch molding machine, which will work moldings, flooring, ceiling and sheathing as wide as twelve inches, and the side heads will work as thick as five inches, hence the machine will work all four sides of material within the dimensions above named. It will also plane two sides of timbers not exceeding twelve by twelve inches and any length; therefore this extra heavy molder is particularly well adapted for car shops, large molding mills, and for working all kinds of hard wood.

The following is a brief description:

The frame is very massive, cast whole, 115 inches long by 45 inches wide on base, 31 inches wide on top and 40 inches high, which give ample room for long and wide belts, and is of such design as to give substantial support to all of the working parts, and to allow of convenient access to the Inside Vertical Head.

The Table is very heavy, amply wide and will lower to 12 inches for the deeper class of work (heavy door rails, etc.). The Ways are adjustably gibbed and the Screw which does the raising and lowering rests on ball bearings, and is operated from the front. Three powerful clamp-screws hold the table firmly in position when adjusted, which makes the machine practically as rigid as an inside molder.

The Feed consists of four six-inch feed rolls, made in three sections, all strongly driven and expansively geared like a planer, and controlled by levers both front and rear which operate a friction clutch that drives a new compound of gearing through a roller chain; hence the feed is very positive as well as most powerful. The weighting of the rolls is done in a superior manner, a spring intervening between the weight-lever and rolls so as to minimize any shocks in starting heavy cuts. Raising the weight lever lifts the feed rolls for withdrawing stock and they may be retained in a lifted position by the prop if desired. The upper rolls have parallel lift and adjust to change the angle with face of machine. The feed shafts are two inches in diameter, and the rates of feed are 11, 18, 29 and 46 feet a minute, by shifting belt and changing one gear, and by one gear more 26 and 36 feet a minute can be added.

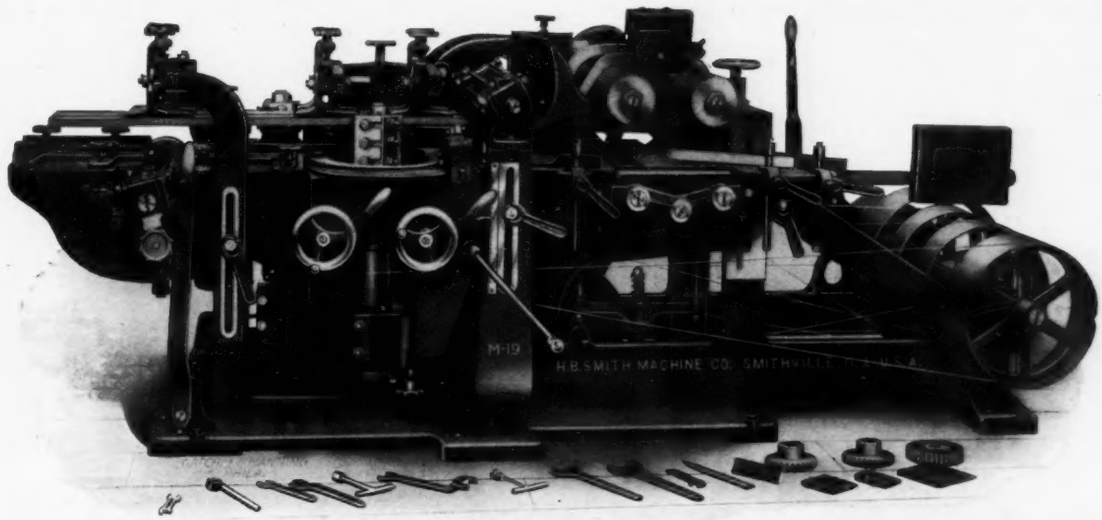
The Patent Clamp Boxes in which all the cutter spindles run, are an improved form of the White Patent, and can be adjusted to the one thousandth part of an inch and the caps clamped as firmly as if bolted. These bearings are equally important for the vertical spindles, in which case the pull of the belt is against the head-stocks. The outside support to main spindle has vertical adjustment.

The Side Heads or their Stocks are attached to the table and adjust and lock from the front. The inside head is perfectly accessible owing to a new style of framing above referred to, which is more substantial than the column style, and the outside head has a weighted Chip-Breaker. Both of the side heads have lateral, vertical and angular adjustments.

The Cutter Heads furnished are made of hammered high carbon steel, four slotted and lipped, and all of the same cutting circle (6 inches) which admits of an interchange of cutters on the different heads.

The Under Cutter Head has adjustment to regulate the depth of cut, and the end of bed after the under head has adjustment to fit the cut as well as being raised and lowered with the head when it is once set to the cutters. Therefore, it is right for light or heavy cut when set for the cutters in use, without further attention.

The Chip Breaker and Pressure Bars are all adjustable, and the pressure feet may be set at angles to suit the work. The pressure bars over the under cutter head have an outside bearing or support which by a clamp-bolt is held firmly to the table and frame. All bars and chip-breakers are readily



NO. 105-A, EXTRA HEAVY 12-INCH OUTSIDE MOULDING MACHINE TO WORK FOUR SIDES

Planes 12 Inches Wide and Table Drops 12 Inches. Inside Vertical Spindle Attached to Table, Adjusts and Locks From Front Side and has Weighted Chip Breaker. Patent Clamp Journal Boxes, Etc., Etc.

DATA AS TO WEIGHT, SPEED, POWER, ETC.

Model	Size Width of Cut	Weight in Pounds	Floor Space Required	Size of T. & L. Pulleys on C. S.	Speed of C. S.	Average H. P.
No. 105-A	12 inches	6520	11 ft. 2 in. x 7 ft. 8 in.	14 in. x 10 in.	900 Revs.	7 to 12

removable for sharpening cutters. The table beyond the under head drops down for this purpose.

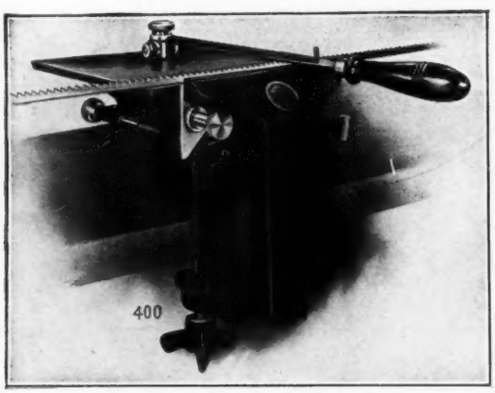
All Screws and Clamps are provided with hand-wheels, handles or stationary wrenches, and a Crank for raising and lowering table, and to back the feed. The spring posts are held solidly by an improved cast steel clamp, which is much superior to the old method of a set screw against the post, and easier to repair in case it becomes necessary to renew one of the screws.

The loose pulley on the countershaft will be made the same size as the tight one unless otherwise ordered, and is provided with patent self-oiling bush, and all pulleys are of generous size and balanced in the plane of rotation so as to run true at any speed.

For further information see advertisement of the H. B. Smith Machine Co. on another page.

The New Britain Band Saw Filer

Hand filing, long recognized as necessary to gain the best results in band saw sharpening, finds its greatest aid in the device pictured. A light band re-saw filed on it and set by the Equal-Blow method, will re-saw a seven-eighths-inch board in twelve thicknesses. This illustrates the perfection



of the sharpening and set and shows the possibilities for good work now within the reach of every band saw user.

To preserve the individuality of hand filing and yet make it as nearly mechanical as desirable, there is a vise in which there is no clamping in the old way between every few teeth. The retention of saw and insurance against chattering is automatic after the saw has been once dropped into place. The file feeds saw along by just pressing it from left to right; the hardened vise jaws yield against such pressure and automatically tighten again when feed has taken place.

The file is guided by anti-friction rolls on a level plate which guarantees teeth being filed always square across. This is the necessary condition for perfect sawing. Any desired amount of hook to the teeth is attained and retained by locking the file against rotation in its holder. Interruptions do not affect the work. One can stop and take it up exactly as left off. So easy does the file work that there seems to be no more force exerted than in free hand filing.

The New Britain Machine Co., No. 1 Chestnut Street, New Britain, Conn., will be pleased to furnish further information in regard to this important invention, the first announcement of which is here made, if when writing, the fact is mentioned that the inquirer is a reader of the AMERICAN CARPENTER AND BUILDER.

The Peerless Brick Machine

This machine was not invented by a mere idea and without practical experience, but the inventor has had twenty-seven years of practical experience with Portland cement machinery for making blocks and bricks. On it 200 blocks 24x6x6 can be made in one day by one man; ten bricks a minute can be made or from 2,000 to 3,000 a day by one man. This machine is built entirely of iron and steel; plow steel,

boiler plate and cast iron is used exclusively, all parts planed and milled out perfect to receive the partitions.

The manufacturer guarantees the Peerless Brick Machine to make as many bricks in a day as most machines will with two men. It is simple in construction, strong, nothing to get out of order, and for quick action it cannot be equaled. Every brick is perfect, as the face is made against a smooth boiler plate giving the face a hard surface. It takes from one and one-half to two and one-half barrels of Portland cement to make 1,000 bricks, and the bricks are perfect in size and durable for all purposes.

Any kind of material can be used in these machines. The machine is self-cleaning, takes out the brick, one motion with one hand, and it is in its place.

Any other information desired in regard to this machine or in regard to concrete work will be furnished by writing to Oliver Nolan's office or factory, 217 Fourteenth avenue south, Minneapolis, Minn.

Received Highest Award at Portland

The Cement Machinery Co. of Jackson, Mich., who are exclusive manufacturers of the Normandin, Peninsular and Cemaco block machines; also the Universal fence post ma-

CEMENT MACHINERY CO. JACKSON MICH.
NORMANDIN BLOCK MACHINES
HUNDREDS OF OUR MACHINES
ADOPTED TWICE BY THE UNITED STATES GOVERNMENT.
HIGHEST AWARD UNIVERSAL EXPOSITION ST. LOUIS.

chines and Systematic mixer, has received direct information from the President of the Lewis and Clark Exposition, at Portland, Ore., that their exhibit of the above named machinery as well as the product therefrom has received the highest award, a gold medal, for superior excellence.

The above named company carried away the highest honors at the Universal Exposition, St. Louis, 1904.

Palmer's New Hollow Block Machine

Harmon S. Palmer, the original inventor of the Hollow Building Block and the machine for making them, is placing upon the market a new machine which he claims is far

superior, more perfect and complete in every way than any machine ever yet devised for this purpose.

This size of this machine, as illustrated in Fig. 1, is two feet by three feet, weighs nine hundred pounds, is twenty-six inches high when open, and workmen can walk entirely around it close to the blocks, and four men can tamp at a time, two at each side. The reader will notice the adjustable sliding hopper fitted to the solid inclined ends. This is planed on the under side, so when the mold is tamped full it strikes off the surplus material, and trowels the top of the blocks, at the same time making all corners of the block solid and compact, and, as the manufacturer claims, is the only way to get sharp cornered stone, it being an adjustable hopper, float and trowel combined. The reader will also observe, in the same illustration, the sliding bed-pieces to which the sides are pivoted and the substantial manner to hold them for any width of block, with also the wedge shape slot to prevent spreading.

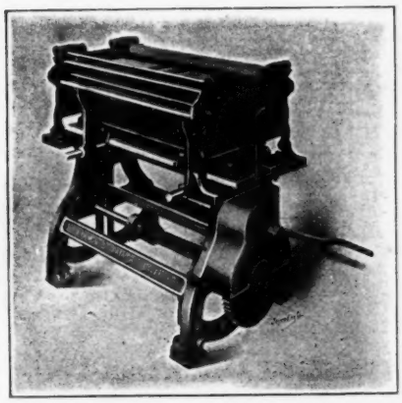


FIG 1

In Fig. 2 is shown the machine partly open; the hoppers here have been used to float and trowel the top of the block. The manufacturer claims that any six-year-old boy can turn the crank, which lowers the cores, unlocks the sides, and which, by their gravity, fall outward, leaving the perfect block, and descend to a horizontal position for its removal without any jar or tremor on account of the perfect counter-balance, never dropping down to break the machine or the newly made block.

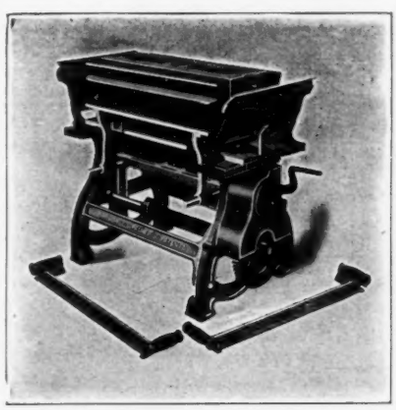


FIG 2

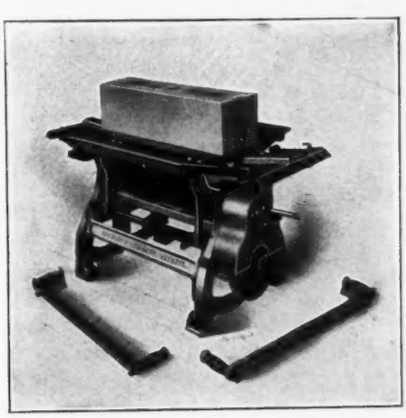


FIG. 3

Fig. 3 shows it in position held open for the removal of the block by the leverage and weight of the sides and ends of the mold. Now it is not necessary to slide the block or move it in any way. To do so is time wasted, and means great risk of cracking the block. Here it is in just the right place, just the right height, nothing in the way; pick it up with a hook and go either side of the machine. The cores are beneath the block, where they should be, completely out of the way. They are bright and clean. They have not been in the way while tamping and have not disturbed the well-compacted mass by being thrust in after the block was partly tamped. To do this would be to ignore one of the most vital principles of perfect stonemaking. They are the right shape to make the strongest block, not leaving thin and weak sides in the stone, which always crack in a building. The manufacturer claims that the mechanical construction of this machine is superb; claims that it will make one-third more blocks and water-proof work in a day, and by less work and complication than any other machine. Fuller information can be had by writing to Harmon S. Palmer, himself, at Washington, D. C., who will gladly furnish the desired information if the reader states he saw this notice in the AMERICAN CARPENTER AND BUILDER.

First Concrete House in New York

The Cement Machinery Co. of Jackson, Mich., has received the following interesting letter:

CHARLES A. MILLER, JR.,
ARCHITECT.

NEW YORK, Sept. 28, 1905.

Cement Machinery Co., Jackson, Mich.:

Gentlemen—It may interest you to know that your blocks are used in the first concrete block house to be built in the city of New York. The building in question is in Staten Island, but is inside the city limits, and is the first the Building Department has permitted. If you are interested I will send some photographs of the same which I have recently taken. These are to be published later, and if you wish I will arrange to let you take the cuts after publication.

Yours truly,

(Signed) CHARLES A. MILLER, JR.

Adjustable Glass Towel Shelf

The problem of obtaining a neat, durable and antiseptic towel shelf has been solved by Geo. H. Anderson & Co., whose advertisement appears in another part of this magazine. Among its many advantages are that the towels never slip; water, whether hot or cold, does not affect them; they need

no cleaning; they never wear out or show use, and the edges are ground and polished, making them neat and presentable at all times. They are so made that no holes are required in the glass, thereby reducing breakage to a minimum. All shelves are so made that glass cannot fall out, although they are adjustable. A catalogue containing full details and prices can be obtained free by writing to Geo. H. Anderson & Co., 281 West Superior street, Chicago.

Revelation in Block Machines

C. M. Runyan & Co., of Elyria, Ohio, have an announcement this month that should greatly interest our readers. They present a number of sound arguments why a prospective purchaser of a concrete block machine should thoroughly consider the many points involved in the purchase before acting. Of their own product they state that it is the simplest block machine ever invented, having the fewest parts, though obtaining the greatest results. They further say that their machine can be operated by one person with the mere strength of a child; that it has no cog wheels or racks to become

clogged; that it is the only block machine that can make solid or hollow blocks, of any size or shape within the dimensions, 16 inches by 40 inches, and can be changed from one size to another in three minutes; that it is the only block machine that will make window or door caps and sills and paving blocks; that it is the only block machine that fills all the requirements of the building trade. These are strong assertions, but C. M. Runyan & Co. say that they can prove them if any of our readers who are contemplating installing a block machine will write to them for particulars.

Slate Blackboards

Those of our readers who are using slate blackboards will be particularly interested to know that M. H. E. Beckley is now making a specialty of blackboard work. He has been before the public for over 20 years as "the man who gives a square deal" in school furniture and he formerly held the position of president of the Standard School Furniture Co. His blackboards have recently been put into the new high school at Delavan, Wis., Barington, Ill., Evansville, Ind., and Morgan Park, Ill. For further information on slate blackboards or the best roofing slate, write to M. H. E. Beckley, 260 Wabash av., Chicago, Ill.

The "Jumper" Dumbwaiter

J. G. Speidel, manufacturer of elevators, dumbwaiters and hoisting machinery, is now placing on the market a new dumbwaiter, called the "Jumper," which is patented and trade marked, a cut of which is shown herewith. One peculiar feature of this dumbwaiter is that it takes up absolutely no room above the floor, so that no matter how small your kitchen or dining room may be it can be placed therein. The top of the waiter is level with the floor when not in use and you can walk over it, as the whole waiter hangs below in the cellar or basement. It is easily operated by pushing a small lever and is strong and durable and will last a lifetime. These "Jumpers" are made of hard wood inclosed on all sides, the front being two cabinet doors covered by a special rust-proof, metallic-coated wire cloth, which permits of perfect ventilation, and at the same time keeping out the flies and other insects. They have eight shelves, every other one being removable. Last, but not least, they are inexpensive and are sold complete ready to hang in the floor; in fact, it takes a carpenter only a few hours to cut a hole in

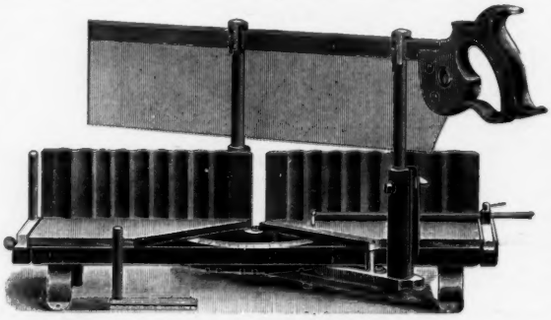
THE IVES' PATENT
WINDOW STOP ADJUSTER
PATENTED
FOR WINDOWS AND SLIDING DOORS
HEAVY BED
INSURES PROTECTION AGAINST COLD DRAUGHTS, DUST, RATTLING OR BINDING
The only Window Stop Adjuster made from one piece of metal that has a heavy bed that will not bend or cup in tightening the screw
THE H. B. IVES CO.
Working model with catalog mailed free.
New Haven, Conn., U. S. A.

ROOFING, GENUINE BANGOR BLACKBOARDS & STRUCTURAL SLATE
ALL ORDERS FILLED PROMPTLY
Order direct from the miners and manufacturers
HEADQUARTERS FOR
SLATE BURIAL VAULTS, CATACOMBS, ETC.
THE BANGOR STRUCTURAL SLATE CO.
LOCK BOX 48 BANGOR, PA

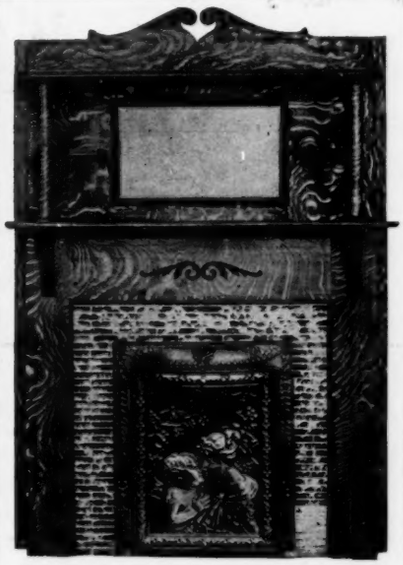
SLATE WE HAVE WHAT YOU WANT
In Roofing Slate, Slate Blackboards
Structural and Plumbers' Slate
SATISFACTION GUARANTEED IN QUALITY AND PRICE
ASK FOR DELIVERED PRICES
J. K. HOWER, Station C., Slatington, Pa.
H. J. KICHLINE, Sales Agent

SLATE! SLATE!! SLATE!!!
Black Boards for Schools - - - - Roofing Slate for Houses
Are you going to build a home? I trust you are, and that you will put on it for a Roof (one of the most important things about a house) SLATE, which is always CLEAN, FIREPROOF and BEAUTIFUL. Write for prices, and I will tell you all about SLATE.
DAVID McKENNA, SLATINGTON, PA.

GOODELL MITRE BOX
MADE ENTIRELY OF STEEL.
No more breaking. Our Automatic Stops for holding up saw are the simplest, quickest acting and by far the most convenient, the saw being released by simply pressing down on it.
Backs corrugated, allowing clearance for sawdust. Graduated. Gauge for duplicate cuts. Many improvements.
Quality ahead and entirely in a class by itself, and the carpenter that once sees it will have no other.
SEND FOR CIRCULAR O AND PRICES.
GOODELL MFG. CO., Greenfield, Mass.



A BARGAIN



Oak Mantel, handsomely figured with veneered quartered oak columns, beveled *plate* mirror, polished and rubbed finish, tile facing (slabbed) and steel summer front, delivered anywhere.

$18.00

Other designs and woods at equally low prices.

We carry a stock of over 200 mantels in 50 designs, in all kinds of woods.

Send *to-day* for our 40 page Catalogue.

Address, *Department "M"* **THE A. W. BURRITT CO.,**
"The Mantel Folks,"
349-473 Knowlton Street, BRIDGEPORT, CONN.

LORENZEN
·MANTELS·

are **not** designed to meet the requirements of persons who are satisfied with **ordinary** common-place designs so universally offered. They are exclusive in pattern, workmanship and material, because no other maker has the workmen, the woods, or even the **inclination** to make them as thoroughly good—inside and out—as the makers of

Lorenzen Mantels, $10 upward

Our Craftsman, Modern Mission and Colonial designs embody the acme of artistic achievement. Nowhere in the world will you find the careful wood selections, the elegance of form and finish, the skilled workmanship.

To Carpenters and Builders Free

We will mail our large, handsome, 96 page (10x22) Catalogue, the largest Mantel and Grille book ever published, which cost us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory. **Write today.**

CHAS. F. LORENZEN & COMPANY
220 N. Ashland Ave., Chicago, U. S. A.

Fifty Lorenzen Mantels were recently purchased by the U. S. Government and shipped direct from our factory to Pekin, China, for use in new buildings of the U. S. Government Legation. After a thorough test of all other makes the government chose the Lorenzen Mantel as superior in attractiveness, workmanship and durability.

LORENZEN PAYS THE FREIGHT

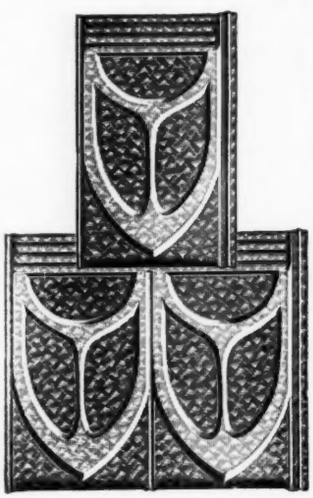
the floor and hang them in. The patentee and manufacturer, J. G. Speidel, Reading, Pa., will be pleased to give you further information or quote net prices.

An All-Steel Sash Pully

The Grand Rapids Hardware Company of Grand Rapids, Mich., have been very successful in their sale of their latest specialty, a patent noiseless all-steel sash pulley, which they have named the "Grand Rapids." Among the many advantages the company points out for this pulley is the fact that it is unbreakable in transit or in fastening it; it is light and strong and will carry the heaviest windows; they are uniform in size, every one fitting the mortise; they have heavy axles, perfect running, true and noiseless. The rear of wheel is so well and amply surrounded that the cord can never get out of the groove and wedge. This saves time and temper and overcomes the great objection to other low-priced sash pulleys. It is a very important feature in which the "Grand Rapids" is superior to all others. The pulley runs in a polished steel groove and thus avoids wear out to cords. It is fully guaranteed.

The "Champion" Metal Shingle

J. H. Eller & Co., of Canton, Ohio, state that they are having great success in placing upon the market their "Champion" lock joint metal shingle. This shingle is suitable for all styles of roofs, gables and dormers. They are made of the best grade of galvanized sheets and full weight I. C. and I. X. tin, painted. This form advances several reasons why the "Champion" shingles should be used, namely: Because they are ornamental; they are not expensive; they are lighter than slate; they do not require special construction to support them; they will not break; they will not warp like shingles; they are absolutely storm-proof; they provide for expansion and contraction.



Besides their "Champion" metal shingles J. H. Eller & Co. deal in metal ceilings, side walls, cornice, skylights, finials, ventilators, tin plate, charcoal, iron tin, solder, eaves trough, conductor pipe, brick and stone siding, roofing, etc. If carpenters are in need of any of these supplies they should write to the above firm, mentioning the fact that they are readers of the AMERICAN CARPENTER AND BUILDER.

Why Not Increase YOUR Earnings?

Mr. William Weber, Contractor and Builder, of Beaumont, Texas, whose picture appears above, says:

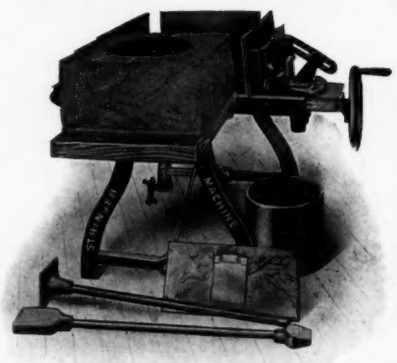
"When I enrolled, I was a bricklayer, earning a bricklayer's wages. I am now a contractor and builder, and the volume of my business is over $200,000 a year. All of this success I owe to the I. C. S."

This proof is merely one of thousands which we have to show that we can help any ambitious man, *no matter what his circumstances are*, to gain a better position and increase his earnings. If **YOU** want to gain a better position, write us today, stating the occupation you wish to rise in, and we will explain how you can better yourself without loss of time from your present work or paying more than you can afford.

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 910, Scranton, Pa.

THE STRINGER
CEMENT BLOCK MACHINE

Latest Improved, Handiest, Quickest Adjusted



Will make blocks any size from brick up. Water tables, sills, angles and gables — HOLLOW OR SOLID. Sewer blocks and fence posts.

STRINGER MACHINE CO.
120 W. Trail Street, Jackson, Michigan

PATENTS Valuable and Salable Patents Promptly Secured. Advice as to Patentability and Commercial Value Free. :: :: Write for Inventor's Hand Book.
Shepherd & Parker, Patent Lawyers.

"During the past ten years Mr. Shepherd, of Shepherd & Parker, has obtained for us a great many important patents. We have no hesitation in heartily recommending him to any one having need of the services of a patent attorney. HALLWOOD CASH REGISTER CO.

Mr. Parker on Nov. 1, 1903, resigned his position as an examiner in the U. S. Patent Office to enter this firm. Address, Dietz Bldg., WASHINGTON, D.

Johnson's Crack Filler

"A Non-Shrinking Adhesive Compound for Filling Cracks Caused by Shrinkage."

The color of Johnson's Crack Filler changes after drying so that it will not show when used for maple and oak. For dark woods the necessary coloring matter may be added. A pound ordinary covers thirty square feet. A putty knife is all that is necessary to apply it.

The next time you require a crack filler use Johnson's and you'll get the best results.

Photographic illustration showing ease of applying Johnson's Crack Filler.

This preparation is now conceded by expert painters and wood-finishers to be the finest in the world. It is a superior substitute for putty as it will not shrink, is antiseptic and moth preventive. It is made especially for filling in cracks between boards, nail and carpet-tack holes in old floors. It may also be used for rough and slivered surfaces.

Johnson's Crack Filler is sold wherever paint is sold;
1 and 2 pound cans, per lb.....25c
5 pound cans, per lb.....20c
Ask your dealer and insist on getting the genuine **Johnson's Crack Filler.** Don't take any substitute.

SENT FREE "The Proper Treatment for Floors, Woodwork and Furniture," our brand new illustrated 32 page booklet of great interest to painters and wood finishers. Contains many unique, practical wood-finishing suggestions. Write for it today and mention edition A.C.B.11.

S. C. JOHNSON & SON, - Racine, Wis.

"The Wood-Finishing Authorities"

Cabinet No. 15

TOOLS NOT TOYS

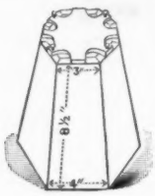
Wivanco Tool Cabinets

OUR TOOL CABINETS are equipped with all the tools needed about the house, shop, or farm, and the use of such an outfit will result in a substantial saving as well as the great convenience of having the little repair jobs done without hiring a carpenter. These cabinets are substantially made of handsome polished quartered oak with brass trimmings, and have two-keyed cylinder locks. The drawer contains a full assortment of screws, screw-eyes, tacks, and nails for any kind of work. Prices, according to assortment of tools, from $10 up. Catalogue of cabinets, work benches, and lists of tools sent anywhere without charge upon request.

600-Page Catalog FREE to American Carpenter and Builder Readers

We have just issued a Big Catalog of over 600 pages illustrating and describing 20,000 articles for house, shop, and farm. The prices quoted are as low as our 90 years in this business make possible—and no house anywhere can beat them. Our location in New York makes shipping by express, freight, or mail easier, quicker, and cheaper than anywhere else. Our book costs us 75c, but we send it to you free if you live anywhere except Chicago or New York City. We send our tool cabinet catalogue free to any one anywhere. **Oldest Mail Order House in America. Established 1816.**

WHITE, VAN GLAHN & CO., No. 28 Chatham Sq., New York City



NEWEST AND BEST

Mitre a board 14 inches wide with a back saw 4 inches wide

IT CAN BE DONE ON

DORN'S REVOLVING MITRE BOX

SEND FOR BOOKLET

Manufactured By **Braunsdorf - Mueller Co.**

1091 E. Grand Street Elizabeth, N. J.

When You Build

Beautify Your Home

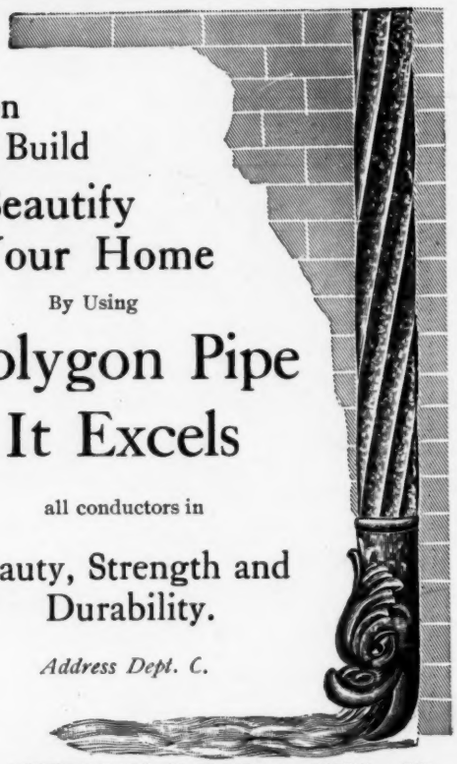
By Using

Polygon Pipe It Excels

all conductors in

Beauty, Strength and Durability.

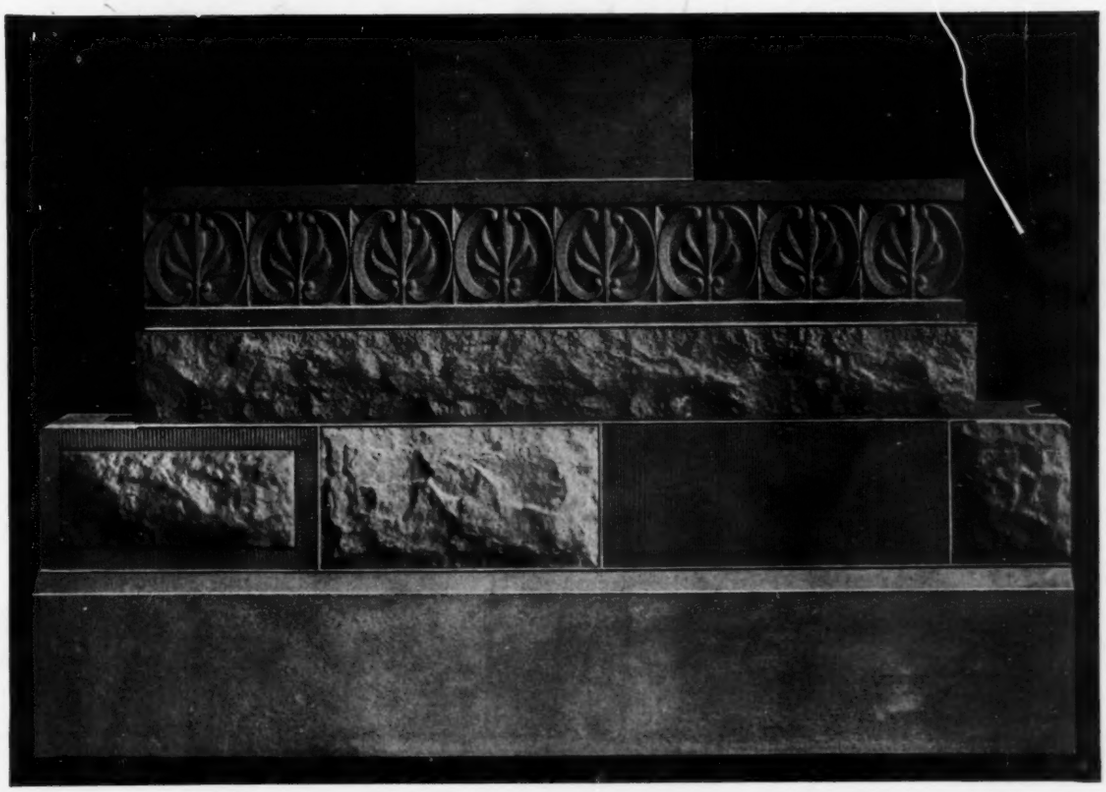
Address Dept. C.



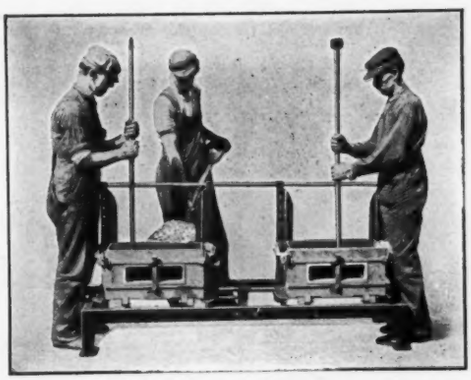
THE AMERICAN ROLLING MILL CO.

MIDDLETOWN, OHIO.

That Hercules Cement Stone Machine



Taken Directly From Stone, Made On One Hercules Machine



Showing Method of Making Two Stone at One Operation

Knowledge is Based on Reason

You may **SUPPOSE** that an artificial stone machine is superior, but if you would know, you must have reasons. We **KNOW** the superiority of

"That Hercules Machine"

Here Are Some of Our Reasons:

Reason No. 1. "That large variety," which means supplying the architects and builders with that class of stone essential for all building purposes. It is the only machine in the world that can make, in addition to hollow blocks of **all shapes** and **sizes,** water tables, sills, lintels, coping and **ornamental** work, up to **6 feet** long, all on the one machine.

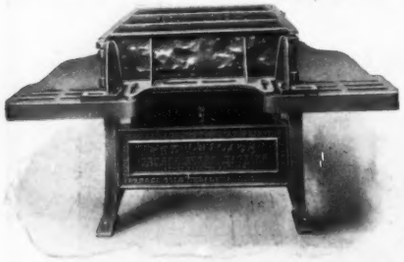
Reason No. 2. "That double operation feature" permitting two stone to be made at one operation, doubling your capacity and reducing the cost of labor to a minimum, saving you the expense of purchasing two machines—important item, this.

Reason No. 3. "That tamp on the face method" guarantees a perfect reproduction of the face plate, which means stone that has the appearance of natural stone,—that bold, sharp appearance,—allows 2 to 1 composition for facing and 5 to 1 for backing—great saving in material, this, and insures a face on the stone that will be durable. By this method you may make your **mixture more wet,** guaranteeing perfect chemical action and a stronger stone.

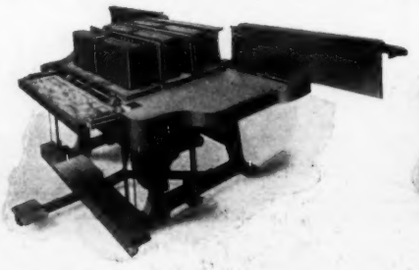
For Accuracy, Strength and Simplicity of Construction and High Class Work, "That Hercules Machine" is Without a Peer. Send for Beautifully Illustrated Catalogue X, With More Reasons

Century Cement Machine Company, 173 W. MAIN STREET ROCHESTER, N. Y.

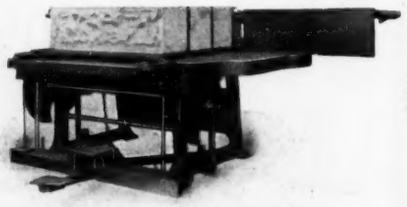
THESE CUTS SPEAK FOR THEMSELVES, No. 4 CHICAGO, 1904 MODEL



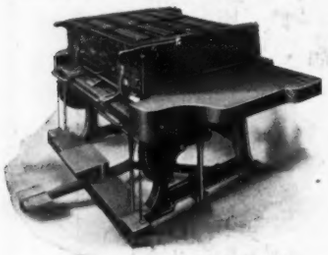
No. 1. Rear view. Set to mould 3½x32 inches at one mould. Adjustable to 60 in. long x30 in. wide. Cores down. Back brace shows patent dates and gold medal award.



No. 2. Front and end view. Set to mould 3½x32 inches. Cores raised, pallets and divisions in position. Mould box ready to close. Name stamp on one division.

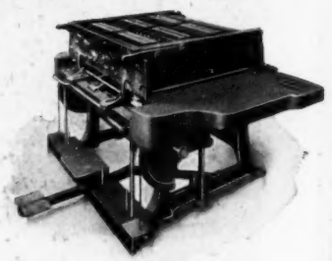


No. 3. 3 blocks moulded 8x32 inches. Mould box open ready to off bear blocks. See pallets and divisions. Cores are withdrawn by stepping on compound lever.

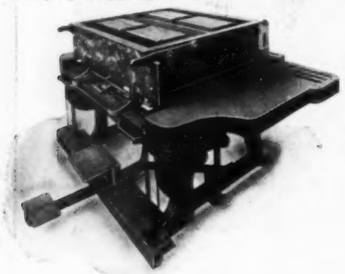


No. 4. Set to mould 4-6x32 inches. Machine is closed. Cores are raised and locked automatically by stepping on lever.

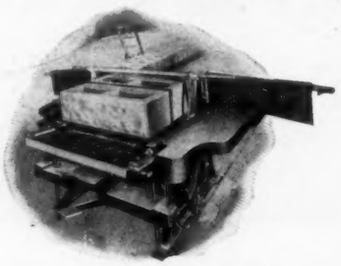
No. 5. Cores withdrawn, divisions removed. Machine open, front and back plate shown. See slotted end doors for divisions.



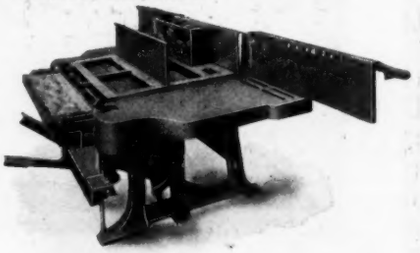
No. 6. Closed. Cores raised. Divisions in position ready to fill and tamp. Blocks can be made any design face.



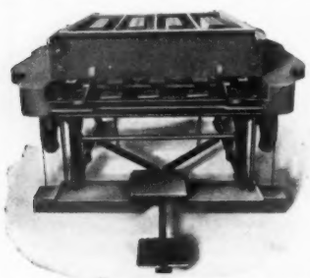
No. 7. 2 blocks, 14x32 inches. Cores raised. Divisions ready to fill and tamp. Cores are raised and lowered with foot lever.



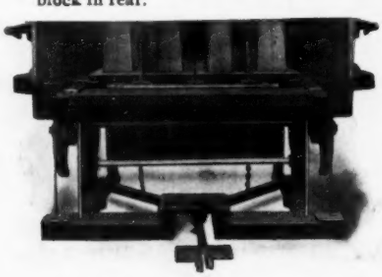
No. 8. 2-14x32 inches. Blocks moulded. Cores withdrawn. Division shown in center. Front block is carried away first. Moulded block in rear.



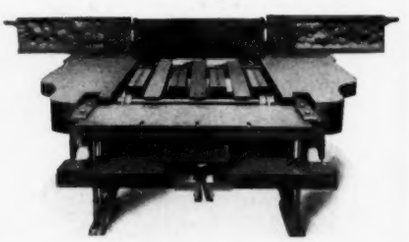
No. 9. Open. Set for 1-10x32 in. straight and 1-10x32 in. corner. Rock face inside angle, plain division. Use rock face division and rock face end to rock face outside angle.



No. 10. Front. Set to mould 4-8x24 inches. Any designs can be used. 4 blocks can be moulded as quickly as one in a common mould.



No. 11. Open. Cores raised. Pallets in position. Center division not in. Has 2 sides of any design wanted.



No. 12. Open. Cores withdrawn. Divisions removed. 24 inch rock face doors shown. The No 4 Chicago is the only perfect adjustable machine.

COUPON

Cut out this coupon and write today for what you want. Keep this ad for it will not appear again until January, 1906.

Enclosed find $1.00 for waterproofing formula for cement blocks.

Enclosed find 25c for cuts and descriptions of cement houses built in all parts of the United States, with cost to build.

Are you in the market for a Block Machine? _____

Do you want to exchange your old machine for a new one? _____

If you are contemplating going into the business we will mail you our catalogue No. 20, with prices, upon request. If you only want general information, call for catalogue No. 10, and state fully in letter what you want to know. Be sure and pin this coupon to your letter and address to **SALES DEPARTMENT, CEMENT MACHINERY MANUFACTURING CO., BURLINGTON, IOWA.**

The above cuts show our 1906 model No. 4 Chicago Machine set in several different ways. Blocks from 32 inches long up to 60 inches long are moulded lengthwise of the machine. Blocks from 19 inches long up to 28 inches long are moulded crosswise of the machine. **We guarantee** twice the capacity of any other machine, and that blocks moulded on the No. 4 machine will not be 1-64th part of an inch out of square or plumb.

We build twenty different styles of block machines, ranging in price from $15.00 up to $450.00, depending on the equipment. We are the largest exclusive manufacturers of cement working machinery.

We were awarded the Highest Prizes at the World's Fair. **We build machines,** not crude, cast boxes. See our machines before buying. Every part of the No. 4 machine is machined and interchangeable. There is no design that we cannot furnish, unless under cut, to work on the No. 4. The cores are raised and withdrawn with compound foot-lever, and being counterbalanced, a boy can draw 8 cores at a time or raise them to position. Cores lock automatically when raised and are released with handle bar in front. We build the No. 1, No. 2, No. 3, No. 4, Junior No. 2, Junior No. 3, and Junior No. 4 Chicago machines. The Junior No. 3 is the same as the No. 3 except cores are drawn from top. The Junior No. 4 is the same as the No. 4 except cores are drawn from top. We have the strongest patents but do not sell territory or patent rights. We manufacture special moulds from drawings. We make patterns for block machines. We carry a stock of pallets for every standard machine and can make prompt shipment. We manufacture every class of cement working tools and moulds. Write us for anything you want. We have more than 2,000 users of Chicago machines, all satisfied. We have shop capacity of 5 machines per day and can ship promptly. We will gladly furnish you a list of users of our machines. We furnish all repairs for one year from date of sale free of charge. We have the best face down machines on the market. We will show you 40 different styles of machines if you will visit us. If we cannot please you, we do not expect you to buy.

If you are are intending to purchase cement working machinery, we agree to pay your transportation if you will visit us, or we agree to ship one of our No. 4 machines to any point in the United States, freight prepaid, and send our representative to start it. If machine is not satisfactory, we remove it at our expense. We will take old machines of any make made of iron in exchange for our new models. We will build you a No. 4 with special equipment just as you want it at less than you can buy a crude mould box. We want every plant to be a success; tell us where you are located and we will tell you what equipment to buy. Don't buy a large outfit if a small one will do; we build them all sizes but we want to sell you only what you have use for. We agree to ship on approval or to pay your expenses to visit us; it will be more satisfactory for you to visit us and see all the different makes and choose just what you want. Last of all, don't buy territory or patent rights. Buy the best machine you can find. Write us today. Cut out coupon, pin to your letter, and address to **SALES DEPARTMENT, CEMENT MACHINERY MANUFACTURING CO., BURLINGTON, IOWA.**

$29 75/100 11 DOORS

DRAW OR STATIONARY CORE

$29 75/100 11 DOORS

THE COLTRIN BLOCK MOLDS—PATENTED APRIL 12, 1904

DROP

$34.75

CORE

11 DOORS

STATIONARY CORE—CLOSED FOR FILLING

DROP CORE—CLOSED FOR FILLING

MANUFACTURED EXCLUSIVELY BY

THE KNICKERBOCKER COMPANY

LIBERTY STREET JACKSON, MICHIGAN

Rebekah's Well

WOULD BE STANDING TO-DAY IF IT HAD BEEN MADE OF **Frost Cement Blocks.**

WE SELL THE MACHINE, YOU MAKE THE BLOCKS

WE HAVE A PROPOSITION TO MAKE YOU RIGHT NOW IT WILL INTEREST YOU

Write us. You cannot afford not to. Our catalogue illustrates our machine, which is practically 40 machines in one.

Write us today, not tomorrow

FROST CONCRETE STONE CO.

607 Commercial Avenue :: :: WATERLOO, IOWA

Waterloo Concrete Brick & Block Mach. Co.

ONE movement of the lever operates the **ENTIRE** machine, consuming the least time for operation of any machine. Two men will make 250 blocks per day.

Our block is patented. Has double, a vertical and horizontal air space.

The brick attachment makes 18 brick as easily as a block.

No gears or chain to clog or break.

Write for catalogue "B" **O. H. SWEENEY, Sec.**

Agents Wanted. **101 E. 4th St. WATERLOO, IOWA.**

Southern Agents, SILVERA & GADSDEN, Savannah, Ga.

Well! Well! Get in Line!

HOW?

By using the Coryell Cement Block Machine. When we ask you to get in line, we mean get in line with a block that will make a hollow wall, so that when your customer asks you if you can build a hollow wall, you will not have to evade the question by saying: Our or my machine makes a hollow block. A hollow block is all right as far as it goes, but they will not make a hollow wall. Now if you want to avoid trouble with moisture and frost, use the Coryell Block, which is better than all, for it makes a hollow wall.

Our catalogue can be had for the asking.

Write, The Kells Foundry & Machine Co.

82 N. Main St. WHO MANUFACTURE AND SELL THE MACHINE ADRIAN, MICH.

TO PLACE ON THE MARKET

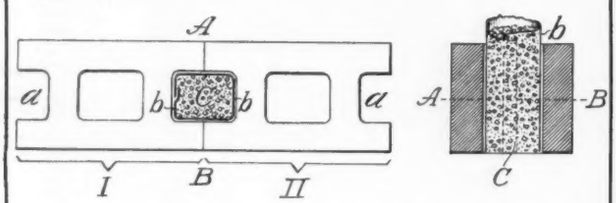
Concrete-Stone Wall Construction

Patent No. 791,293, 30 May, 1905.

NICOLAS SCHIETKIEWICZ
Sadowat 26, lg 97
ST. PETERSBURG, RUSSIA

The object of the invention is to secure a tight and non-conducting joint between the ends of the concrete blocks.

Each block is provided at each end with a vertical recess (*a*), extending from the upper to the lower face of the block, (*A. B.*)



The vertical recess (*a*) of adjacent ends form a comparatively large vertical chamber. A loose roll (*C*) of tarred paste-board, felt, asphaltic felt or other suitable material is placed in each said chamber.

A filling (*c*) is inserted in the roll (*C*), and said roll is expanded and pressed against the interior faces of chamber (*a*). The vertical joints between the blocks are thus tightly closed or sealed.

It is always safe to be first

CONCRETE
Construction Taught
BY MAIL

Artificial Stone Making
Concrete Steel Construction
and Hollow Block Building

3 Practical Courses by 3 Practical Instructors

Send for Catalogue and be the first in your locality

College of Construction

Cleveland, Ohio

THE FACE PLATES

of our $25.00 concrete Stone Outfit are all interchangeable. The stone made by it are just as artistic of design and as practical for building buildings as those made on the more expensive machines. We ship to responsible parties on ten days' trial. 411 machines shipped on trial during 1904; only three were returned. If we were selling gold dollars for 90 cents each we could scarcely hope to beat this record. Don't argue—we pay the freight when not satisfactory. Send for our book of instructions for making concrete stone.

CEMENT WORKING MACHINERY CO.

195 LAFAYETTE AVE., DETROIT, MICH.

THE IMPROVED "MILES"

CONCRETE BUILDING BLOCK MACHINE

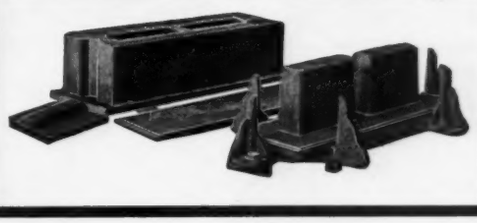
MOLDS ALL BLOCKS FACE DOWN

Makes circles, octagons, gables and water table blocks for hollow, solid or veneer walls.

Write us today for circulars and descriptive matter

THE P. B. MILES MFG. CO.
Suite 23, Dwight Bldg.
JACKSON, MICH.

Concrete Blocks! The Clipper Block Machine Produces Them



The Clipper Block Machines are simple, durable, light, strong, accurate, and will produce a great variety of shapes and sizes in hollow blocks, veneering blocks, chimney blocks, pier blocks, circular blocks.

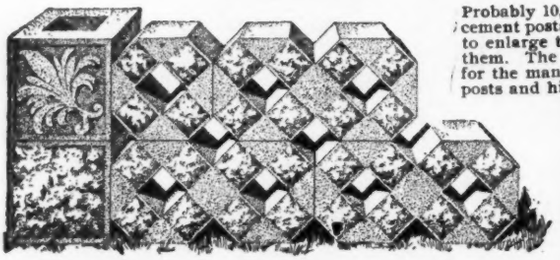
ALL FACE BLOCKS TAMPED WITH THE FACE DOWN.

Rock faced, plain faced, panel faced.
Continuous air space, damp and frost proof.
Machines on the installment plan.
Write for particulars.

R. T. FROST, Exclusive Agent
Address Dept. "A" Dows, Ia.

THE CROUCH SYSTEM

THE SAND PALLET BEATS THEM ALL



Probably 10,000 persons contemplate engaging in the manufacture of cement posts or cement building blocks this year. Many more propose to enlarge their plants or perfect their equipment. You are one of them. The **cost** is an item of importance. Before buying a machine for the manufacture of cement building blocks, porch blocks, fence posts and hitching posts, write for my new catalog and learn about the **Sand Pallet** and the **economical** system of making them.

By using the **Sand Pallet** you cut out the cost of wooden or metal pallets. This item alone will save you $200 to $500 on a small outfit to make 150 blocks per day. This amount is more than I ask for an outfit to make 25 varieties and sizes of stone, posts, lattice and piers. Besides this, the other kind of machine costs more than mine. You will be **right** when you adopt the Crouch System.

J. M. KEITH, 1190 West 4th Street, Des Moines, Iowa.

GET A MACHINE THAT WILL

DO THE BUSINESS

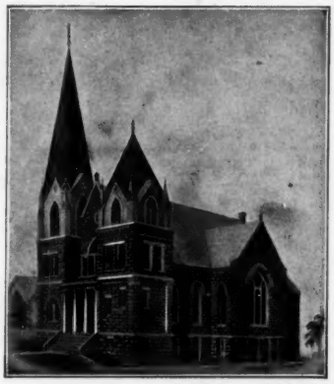
The cut of the church shows what can be done with the Stewart Machine, as this church was erected of blocks made on a Stewart. You can make blocks in any old box, but if you want to make good blocks,

GET A STEWART

Write for catalogue to the

STEWART CEMENT BLOCK MACHINE CO.

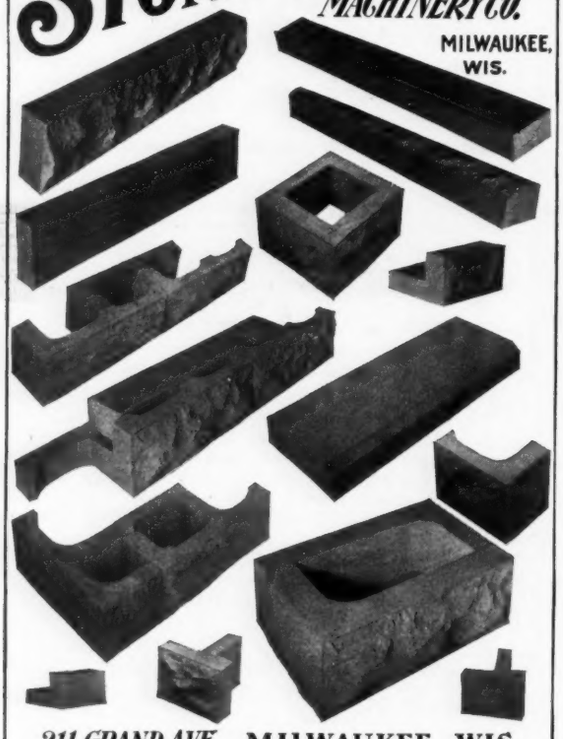
888 Lafayette Block, WATERLOO, IOWA



CONCRETE STONE

MADE BY NATIONAL BUILDING BLOCK MACHINERY CO.

MILWAUKEE, WIS.



211 GRAND AVE. **MILWAUKEE, WIS.**

YOUR ATTENTION AGAIN

Showing Face Down Position.

THE WINGET CONCRETE MACHINE CO., of Columbus, Ohio, are fulfilling their promise made in this space last month and illustrate herewith their **Universal Concrete Machine**

THE WINGET 1906 MODEL

This is called a **Universal** machine because it combines completely all the **three** standard kinds of machines into **one** machine, and does the work of them all most perfectly and quickly.

Up to this time the purchaser of a concrete block machine must choose either an **upright** machine, a **face down** machine or a **two piece** block machine separately. Now if he buys a **"WINGET"** he gets them all in one, and to his great advantage all the movements are quickly and easily operated by one simple automatic lever.

As an **upright** machine it has never been equaled in wide range of adjustments, speed, economy and ease of operation. As a **face down** machine it far excells others in convenience of operation, but more notably in its great advantage of being the only **face down** machine that gives finished molded surfaces to all sides of the block, all other machines leaving a rough, irregular troweled surface on one side. As a **two piece** block machine it has the advantage that it makes two of these blocks at once. For full particulars regarding the Winget System of Concrete Machinery, address the Columbus office or branches,

New York Chicago St. Louis Los Angeles Greensboro, S. C.

McKELVEY
CONCRETE MIXERS
FOR BLOCKS

McKELVEY CONCRETE MACHINERY CO.

NEW YORK LIFE BUILDING, CHICAGO
1215 FILBERT ST., PHILADELPHIA, PA.

A simple, economical and efficient batch mixer, complete with power.

We build mixers of various sizes, with any kind of power, including hand power.

We invite inquiry.

"TEN MACHINES IN ONE."

Absolutely the Best.

Style "C" Normandin Block Machine—(Closed) the only durable machine on the market.

NORMANDIN HOLLOW CONCRETE BLOCK MACHINE

and its product, is universally recognized by the leading architects, contractors, engineers, builders, railroads and cement workers AS THE STANDARD.

Hundreds of Normandin machine plants in operation. The Hollow Block business is permanent and profitable, broadening in extent every day. It's not a question of material but it is a question of machine. The Normandin is what you want, take no substitute. INVESTIGATE for yourself, in fact "*look before you leap*," get value for your money. Don't get a machine because it's cheap and be handicapped when you get a contract for an up-to-date building, because you can't make the blocks wanted—Normandin Blocks are standard.

The Normandin machine is "ten machines in one," designed to save labor, material and expense. *Adopted and used by the United States government engineers.* "The Normandin must be right." The most practical machine ever manufactured. Has won over all competitors. We are pioneer block machine manufacturers, and have just the machine you want. We know what the trade demands, consequently we build our machines right. Thousands of Normandin Blocks being used daily. Send for full printed matter to-day.

Styles and Variety of Stone Unlimited.

Style "C" Normandin Block Machine—(Open) and its Product. HIGHEST AWARDS Universal Exposition, St. Louis, 1904, for superior excellence.

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CEMENT BRICK

BE YOUR OWN BRICK MAKER

LARGE CAPACITY — 5,000 BRICK PER DAY
SKILLED LABOR UNNECESSARY. SIMPLE AND INEXPENSIVE

Seaman's Cement Brick Machine Co.
23 Fountain Street . . . . . Grand Rapids, Michigan

ESTIMATE INTELLIGENTLY

you can do this on any class of work that an architect or customer may require because you can figure within a very small fraction just what it will cost to deliver the goods with a

"BATTJES" CEMENT BLOCK MACHINE

labor-saving, simple, direct and efficient it does the work, and it makes practically an unlimited variety of blocks at no additional expense for plates.

MORE INFORMATION FOR A POSTAL.
Send for a copy of the "CORNER STONE."

The Battjes Building Material Company
GRAND RAPIDS, MICHIGAN

We Move the Machine NOT THE BLOCKS

Saves labor of off bearing, loss by damage; obviates necessity for heavy and expensive iron pallets. Reduces cost o plant and cost of operation. Every one knows that concrete should not be disturbed after it is molded or while it is setting, but this is the only machine by which this is possible. The blocks cost 6 cents to make—sell for 18 cents. One man can make 200 blocks per day. Whole outfit costs $125.00. Figure the profits.

Competition simply demonstrates the superiority of the Pettyjohn machine. Unlimited guarantee. SENT ON TRIAL

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FACTS CONCERNING THE

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All parts are machine finished and every block guaranteed perfect.
Makes all forms, **Solid or Hollow Blocks.**
Has fewer parts and works easier than any other machine.
No Springs—No Cogs—No Wheels. Simplicity and **durability** its strong points.
Either **Wood or Iron Pallets** for all kinds of work.

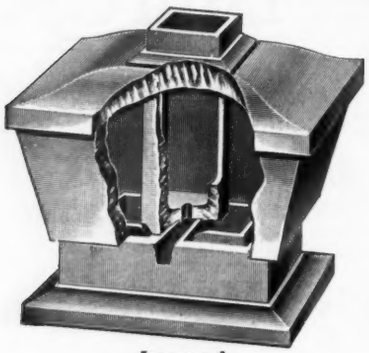
THE SCHEIFFLER, Continuous Automatic Proportioning Mixer

The only Mixer that will automatically proportion in any amounts from 1 to 2, to 1 to 10, and **will not clog** with Cement.
Made in all sizes; any kind of power required.
Used for all kinds of **Street and General Contract Work.**
Hand Machines are fitted with pulley power—can be attached.
Are especially adapted for **Concrete Block Manufacture.**

HARTWICK MACHINERY CO.

228 Washington Street :: JACKSON, MICHIGAN

CONCRETE CHIMNEY CAPS



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Useful, Durable, Inexpensive

Architects recognize and specify on their merits.

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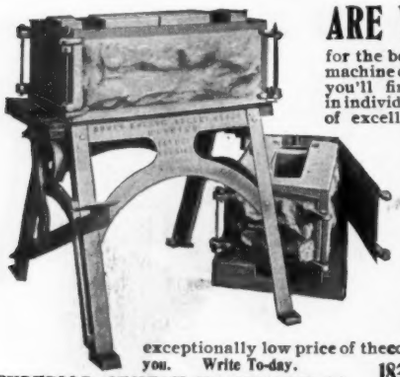


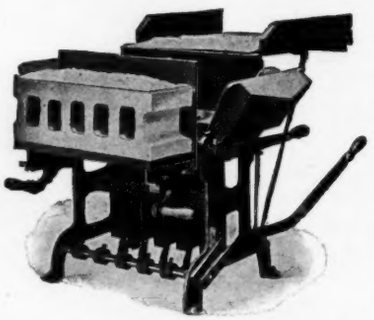
ARE YOU LOOKING

for the best hollow cement stone machine on the market? If you are, you'll find that **our Machine** is in individual and combined points of excellence superior to those costing five times as much. It makes better blocks, more of them and a large variety with one size pallet at 6c for all size blocks.

The machine will **pay for itself** at the very start and **save you money** every day in the cost of production. Outfit includes face plates for caps and sills up to 60 inches in length. The exceptionally low price of the complete outfit will **surprise you.** **Write To-day.**

SUPERIOR CEMENT MACHINERY CO.,
D. GOODMAN, Mgr. **Agents Wanted.**
183 E. Washington St.
CHICAGO, ILL.

The Standard Sand & Machine Co.



BEST in the world. No experiment. Been on the market since 1903 and successfully stood the test. Ask for catalog "A" and prices.

The Standard Sand & Machine Co., Cleveland, Ohio.

IT'S A HOOSIER

AN IDEAL FACE-DOWN

CONCRETE BLOCK MACHINE

PRICED COMPLETE, including Iron Pallets that will not warp, split or have to be replaced.

PRICE Well, this is attractive and will interest you.

ADDRESS

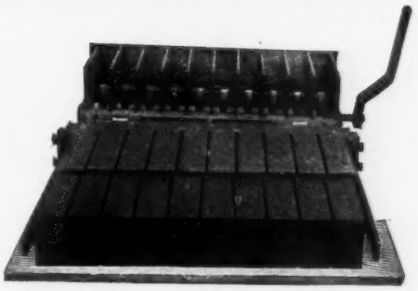
Hoosier Mfg. Company

Auburn, Ind., U. S. A.

The Peerless Brick Machine

10 Brick a Minute,

Or from 2,000 to 3,000 a Day by One Man



This machine was not invented by a mere idea and without practical experience, but the inventor has had 27 years of practical experience with cement machines. If you buy the PEERLESS you get the benefit of long experience. All kinds of fancy brick, and for colored brick any color face ½ inch. Built of plow steel and strongly made. Simple, cheap and fastest working machine on the market.

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Residence, 1811 18th St., South

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A MODERN PRODUCTION.

Do You want the simplest block machine ever invented?

Do You want the block machine having fewest parts though obtaining greatest results?

Do You want the ONLY block machine that has no complicated parts to get out of order?

Do You want the ONLY block machine that can be operated by one person with the mere strength of a child?

Do You want the block machine that has no cog wheels nor racks to become clogged?

Do You want the ONLY block machine having a lever and counter-weight movement, all covered by strong patents, — claims allowed?

Do You want the ONLY block machine that can make hollow or solid blocks, of any size or shape within the dimensions, 16 inches by 40 inches, and can be changed from one size to another in three minutes?

Do You want the ONLY block machine that uses but ONE width pallet on which to make five different width blocks (the same being covered by strong claims already allowed) thus saving to the buyer of a complete outfit, several hundred dollars?

Do You want the ONLY block machine that combines the simplest mechanism to successfully make blocks, face downward or horizontal?

Do You want the ONLY block machine that will make window or door caps and sills, and paving blocks?

Do You want the block machine that will make the most blocks, of the best quality, of the greatest number of varieties, in the least time with the least labor?

Do You want the ONLY block machine that fills all the requirements of the building trade?

Do You want the ONLY block machine that is constructed on strictly scientific principles?

Do You want the block machine that is the climax of mechanical skill and ingenuity?

For all information concerning this machine, address,

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N. B.—Watch this space next month.

40,000 SAND-CEMENT BRICK or 5,000 BLOCK (8 x 24) PER DAY

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We also make an up-to-date mixer.

Write for our Catalogue of power machines, also of our perfect bond, damp-proof block wall. (Hand moulds),

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Special Elastic Compound for Each Specific Purpose.

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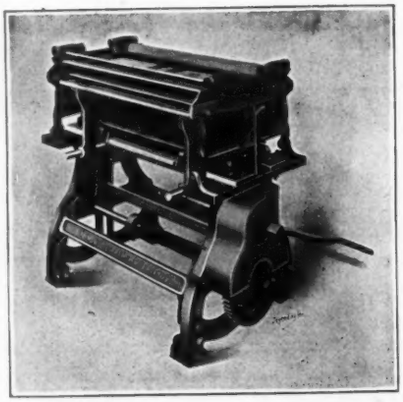
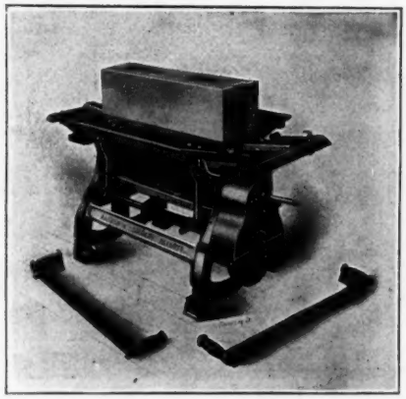


Only Machine that can make Water-Proof Work



The original inventor's latest production in Hollow Concrete Building Block Machines; advancing the industry one hundred per cent

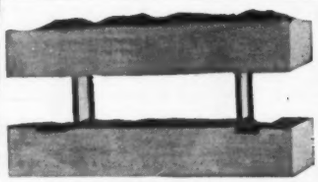
Harmon S. Palmer's Self-Closing-Automatic-Adjustable

The Crystallization of Every Merit in the industry to date. Blocks of every size, length, angle, height and contour produced with astonishing ease and rapidity. Also brick. A marvel of ingenious attachments to the machine which has made more buildings than all infringers and imitators combined. We gave the world the Hollow Concrete Block Industry, the first machine and the first practical block. In the race for advancement and business, we are still in the lead.

Two Highest Awards at St. Louis Exposition. Adopted by the United States Government and Panama Canal Commissioners.

Wanted!—Live Agents, Good Factories and Local Lawyers

We agree to prosecute infringers. Many already enjoined. Many suits pending.



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Makes the only reinforced ***steel bonded*** block and the best bridge block on the market. It makes them in all sizes and in many designs all on the one size wooden pallet. The most complete portable machine on earth. Equipment includes plates for sills and lintels up to 60 in. long. The exceptionally low price will interest you. ***Machines sent on trial.*** Also molds for sewer pipe, well curbing, tanks, manholes, etc.

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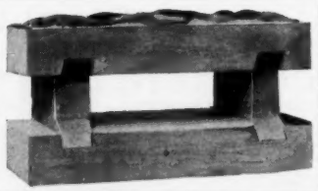

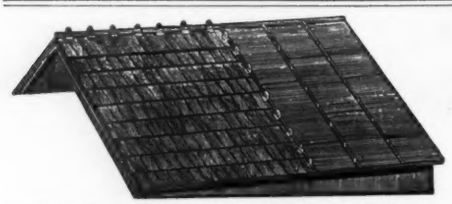

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Cheaper than tin, slate or reshingling. Cooler in summer; warmer in winter. Saves insurance and danger from fire.

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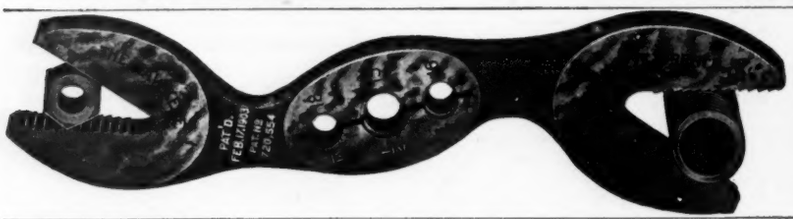

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100 LITTLE DREAM PANETELLAS **$2.50**

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We refer you to any bank or mercantile agency in Chicago. *You run no risk.*

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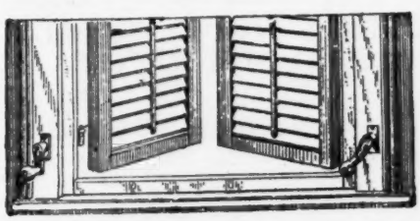

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Opens and closes the blinds without raising the window.

Automatically locks the blinds in any position desired.

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Requires a simple, rapid, practical method.

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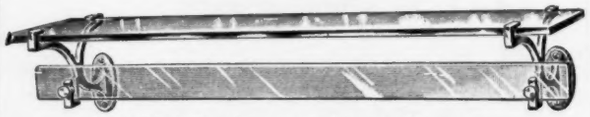
WITH PLATE GLASS TOWEL BAR COMBINED



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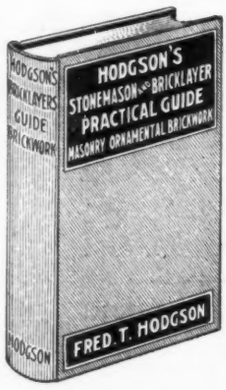

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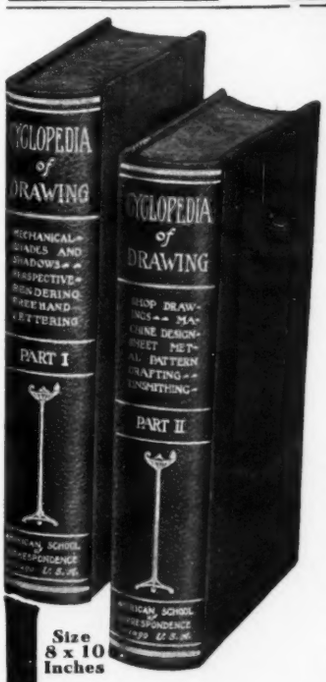

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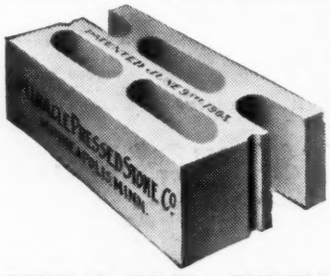

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